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INDIA RUBBER WORLD

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Kaysam

A Casting Process for the Manufacture of Rubber Products from Latex

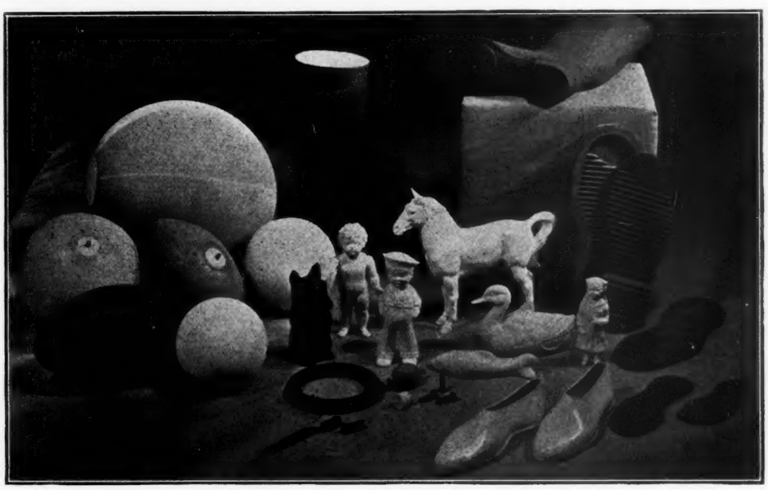
David Roy Cutler [1]

THE uncivilized artless minded natives were producing shoes, bottles, and syringes directly of latex for their own needs at the time of Charles de la Condamine's research expedition to the Amazon country for the Paris Academy in 1736. It is also recorded that Columbus observed Indians playing with rubber balls—undoubtedly made directly of latex—as long ago as 1493.

The Natural Method

These circumstances are recited here, not because of their historical importance, but rather to introduce the point that such mentalities instinctively follow simple natural procedures in providing for their material needs; these failing, they proceed in the toleration of want.

As distinguished from the mentally limited native, civilized man utilizes his higher order of mind to master difficulties that beset the path of his efforts to obtain a desired objective.



In This Collection of Kaysam Products Are Hollow Balls and Toys, Semi-Hollow Boots and Shoes, and Thick Irregular Contoured Soles and Heels

Such, figuratively, is the history of the latex application phase of the rubber industry, which accounts for the hundreds of years' lapse of time intervening the early latex manufacturing activities of the natives and those of our present rubber workers. For all practical purposes the accumulation of knowledge leading to latex manipulation is confined almost entirely to less than the last century and then most effectively to the last 20 years of that period.

Actually many conditions resulting from lack of scientific knowledge conspired to prevent industrialists of the civilized countries, all far removed by time and distance from the jungle sources of rubber, from utilizing latex in their early efforts to commercialize rubber products, thus making it necessary for them to confine their endeavors to manipulations beginning with rubber in the coagulated crude dry form.

Latex Stabilization

First encountered among these preventative conditions

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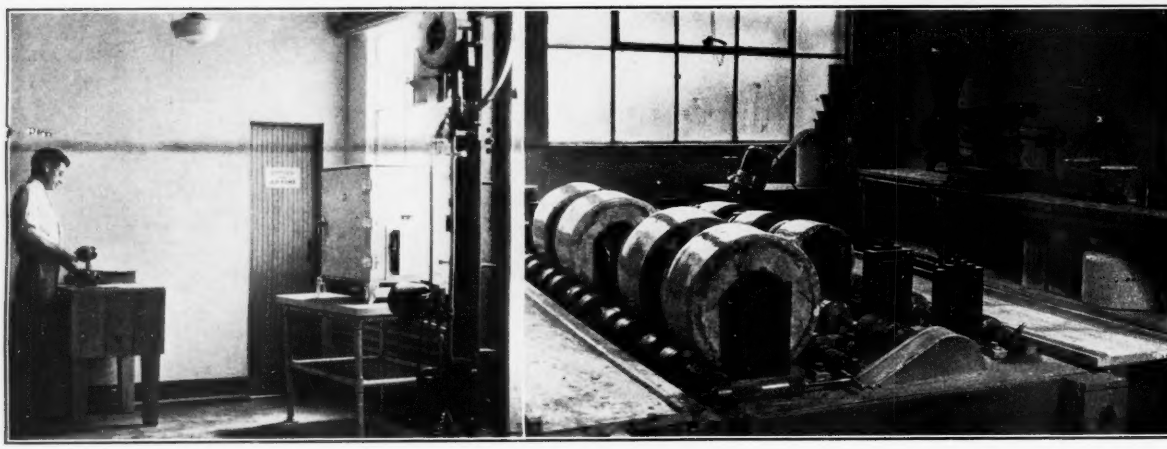


Sections of Physical Testing and Latex Compounding Laboratories, Rubber-Gel Products Corp.

was the fact that latex could not be commercially transported. Thomas interested himself in direct latex applications as early as 1824. Patents were granted to him covering the use of latex in making artificial leather and for the impregnation of textiles. His interest subsided, however, when latex, shipped at regular intervals by an agent in Tampico, arrived almost invariably in a state of coagulation. Not until after 1850 was a means of stabilizing it against unavoidable enzymic and bacterial coagulation generally known. This date is fixed by the patents of Branner, U.S., 1852; Norris, U.S., 1853; and Johnson, Brit., 1853, some 75 years following the inception of manufacturing articles of crude rubber in England.

That these early discoveries were not wholly adequate for suitably keeping latex in a workable condition is evidenced by the scores of preservative improvements presented for patent protection by leading rubber technologists in the years following the World War, which time really marks the determined reinstatement of the problem of seeking a direct natural method of rubber manufacture.

A New Field of Science

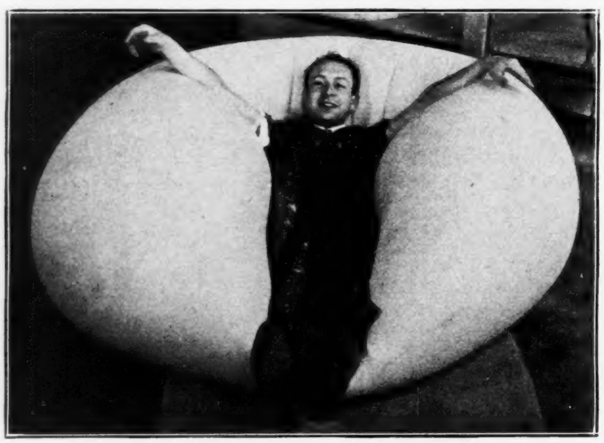
Next, and parent of all the long insurmountable difficulties as they now are known in retrospect, is the fact that latex is a colloidal system, the complicated physical and chemical behavior of which has been so little understood, until recent years, that all attempts of direct application resulted in discouraging failures.

From the time of the aforementioned discoveries until approximately 1917 few advances were made in the study of latex fundamentals. About this time, however, the progress of research began to appear consistently and has continued since at an ever-increasing rate, reaching a prolific climax in the years since 1925. Much of the impetus was supplied by the pioneering contributions supplied by such men as Hopkinson, Schidrowitz, and Hauser.

At present approximately 2,000 patents are issued dealing with the treatment, formulation, and processing of latex related to direct manufacturing purposes. Nor would anyone dare suggest that scientific interest is waning. It is undoubtedly true, though, that a larger proportion of the total attention now is addressed to interpreting the accumulated scientific findings into ever-broadening commercial applications. This would be substantiated by the consumption of latex in the United States alone of approximately 15,000 tons in 1935 as against 4,700 tons in 1932, and only 3,000 tons in 1929.

Latex-Crude Ratio Small

In spite of this astounding increase when viewed percentagely, the volume is small compared to the 481,000 tons of crude rubber transformed by mastication into rubber articles during 1935. It is estimated that more than half the latex consumed here enters products which formerly contained no rubber, such as paper binder, textile treatments, protective films, also certain types of metal coverings, cellular rubber, and small molded articles of very limited types; whereas the remainder enters tires, thread, insulation, adhesives, and dipped goods including various types of hygienic and sporting articles as a superior substitute for crude rubber.

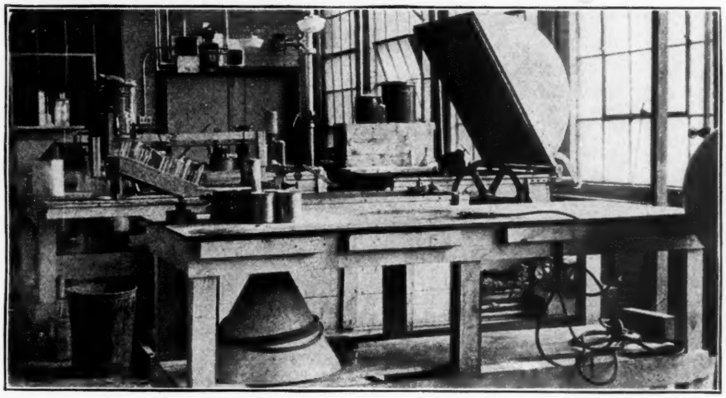


Ball Casting Made in 5⅝-Inch Diameter Mold with 300 Cc. Latex Mix—Inflated to Five Feet in Diameter While Unvulcanized and Has Strength to Support the Weight of a Man

A Method of Shrinkage Control

Various practicable methods of applying the solids of latex and latex mixtures in the manufacture of the above-mentioned types of products have been employed in this country during the past years. While meritorious within their respective fields, these processes, except that for the production of sponge rubber, all have the common limitation of being successfully applicable only to articles of comparatively thin rubber mass and then only when of relatively uniform

gage. The recent introduction into this country of another important English invention, Kaysam, supplies the positive three - dimensional shrinkage control and accelerated drying method, which now opens vast new fields of all types of products to the superior strength, stretch, tear resistance, aging, and public preference advantages characteristic of articles made directly of latex.



Technical Department Laboratory of the Rubber-Gel Products Corp., Where Are Tanks, Tables, and Rotating Machines Typical of Kaysam Production Equipment Simplicity

The Kaysam Process

Briefly expressed, the Kaysam process is a method of casting hollow, semi-hollow, or solid rubber articles of any shape or size from liquid latex, compounded or not, in non-porous metallic forms by employing a short sequence of simple operations varying somewhat with the specific product. It consists essentially of the following steps:

1. Sensitizing a liquid latex mix to cause solidification to an irreversible gel when desired.
2. Pouring the sensitized latex into a suitably designed aluminum mold.
3. Solidifying the mold encased liquid by permitting it to stand at room temperature or by the application of heat such as submersion into hot water.
4. Removing the gelled casting from its mold and washing in warm water to inhibit proper shrinkage and to enhance the quality characteristics of the resultant product.
5. Drying by accelerating the natural water expelling disposition inherent with a gel of this structural type.
6. Vulcanizing in steam, hot water, or hot air.

A more comprehensive understanding of Kaysam can be portrayed with a somewhat more explicit discussion of its principles, applications, and advantages, making also at appropriate points comparisons with latex methods in general as well as with those of masticated rubber.

The Kaysam Development

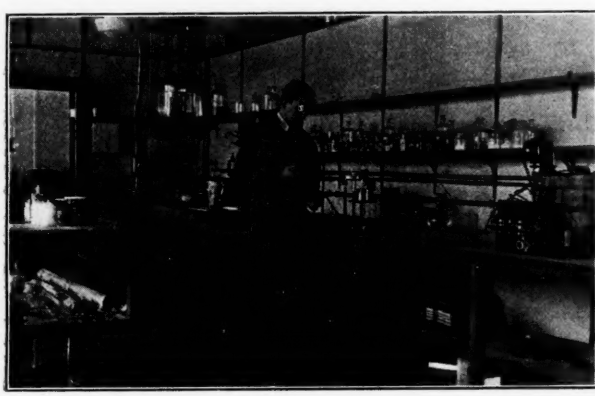
Confronted with the conflicting problems of distressing competition on the one hand and the necessarily wasteful and uneconomic methods of producing crepe rubber soles, on the other, Walter Kay, of Sam Kay & Co., Bury, England, despaired of meeting the problem except by some workable substitution of latex for crepe rubber. The result of his experimental effort was a workable process of casting liquid latex into rubber articles without limitation of size or shape. This process became known as "Kaysam," a contracted inversion of his company's name

Application of this process to the volume production of many types of soles, metal inserted heels, and cloth inserted boots, also various kinds of molded articles including those of solid and hollow construction has been made in England during the past several years. Its application has since been extended to various continental European countries. More recently still, Kaysam, supplemented by other important inventions of prominent American technicians relating to the fundamentals of latex compounding and use, has been made available to manufacturers in this country by the Kaysam Corp. of America, founded by Allan A. Ryan and his sons, Allan A., Jr., Theodore S., and Fortune P.

Concerning the outstanding importance of the Kaysam invention and its far-reaching future commercial potentialities, Dr. E. A. Hauser spoke with highest approbation before several rubber groups while visiting the United States late in 1934 and early in 1935, prior to its adoption by American manufacturers.

Equipment Advantages

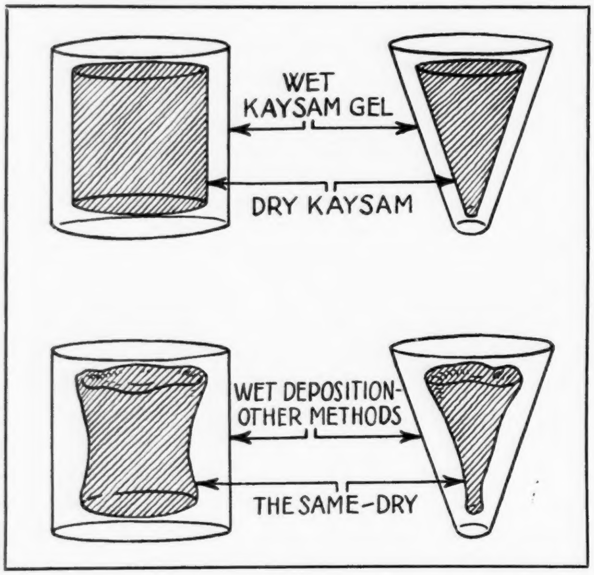
It is now quite generally known that one of the many important advantages of the direct latex or natural method of producing rubber articles as against the masticated crude rubber method is that of an almost negligible ratio of equipment investment, and also proportionately reduced maintenance and floor space requirements. Compounded latex, alike for Kaysam and other methods, involves the use of such inexpensive equipment as tanks, ball mills, colloid mills, and transferable mechanical stirrers; whereas crude rubber methods involve heavy, ex-



Sections of the Research and Experimental Chemistry Laboratories of the Rubber-Gel Products Corp.

pensive, high power and labor consumption open or closed mixing mills, plasticators, strainers, calenders, cooling and storage racks, large motors, gear reduction units, etc.

While latex methods in general are favored with the greatest equipment investment saving in the compounding and mixing phases, additional savings exist in subsequent stages of production such as preparatory or constructional operations, curing, and finishing. A further important consideration resides in the fact that the investment in equipment for latex procedure can be related directly to the planned volume of production, whether for an occasional sample or continuous large or small output. As opposed to this, however, the crude rubber method requires about 75% of the cost of an economic production unit to be expended before a single article can be made, and this large amount of equipment must be put into use at least part time even if but a few samples are to be made.



Kaysam Products Shrink As They Dry from the Interior, but Retain Their Shapes—By Other Methods Bulky Articles Distort As They Dry from the Exterior; Thus Kaysam Mold Sizes Can Be Calculated by Precise but Simple Mathematical Formulae

Latex methods in general and the Kaysam process in particular lend themselves readily to automatic production equipment and to continuous operation.

The equipment phase should not be passed without noting that plans for manufacturing with latex, unlike those for crude rubber, may eliminate compounding equipment investment altogether as any type of suitably compounded latex mixes is obtainable in any desired quantities from firms specializing in this field.

Latex Quality Advantages

Latex rubber has, intrinsically, a much higher strength than milled rubber and will age better. Thus, for example, a sheet of pure gum compound as used for 25-count rubber thread compares with a similar mix of latex as follows:

Stock	Gage	Tensile Lbs. per Sq. In.
Latex mix (dried to sheet and cured)	40	4,500
Masticated rubber (vulc.)	40	2,950
Latex mix (dried to sheet, not cured)	40	1,700
Masticated rubber (unvulc.)	40	1,000

In addition latex compounds are notable for their high tear resistance, toughness, and elasticity as compared with similar formulations of masticated rubber.

When it is necessary for the manufacturer to consider cost against comparable quality, as competition often requires, this superior quality characteristic gives latitude in compounding facility, which does much to offset or even overbalance the cost differential between latex and crude rubber grades. The advantages of reduced equipment investment carrying charges, maintenance, power, and other items of overhead as well as the reduced waste and labor expense then become important allies in meeting the cost problem.

Kaysam Sensitizing

The Kaysam process applies with equal efficacy to preserved natural or artificial latex dispersions of practically all types, compounded or not, but in either event preferably in a 60% to 70% concentration containing zinc oxide or zinc salts.

According to the preferred procedure suitable quantities of these salt solutions are added to the prepared mix to make it sensitive to temperatures slightly above room temperature and as high as 90° C. This reactive temperature can be definitely controlled, and the resulting mix is indefinitely stable below the desired critical temperature. Upon the application of heat the stability of the compound, which normally has been sufficient to protect the individual particles from coalescence while in Brownian movement, is decreased, resulting in a simultaneous and uniform coherence of the individual particles producing a tough irreversible gel.

Careful consideration of the available facts indicates that the essential difference in the method of formation of Kaysam gel on the one hand and a coagulum on the other is the uniformity of coherence throughout the mass of latex particles. Stated another way, the gel is formed by the coherence of a large number of very small particles, the resulting gel possessing very small voids; while the coagulum is characteristically formed by the coherence of a few relatively large aggregates (built up, to be sure, from very small initial particles) having a structure possessing large voids, which is mechanically weak and holds the entrapped water very loosely. It is the uniform formation of the solid and liquid phase of the mix into two continuous phases which constitutes this gel structure, that permits the uniform shrinkage and syneresis action that accelerates drying of the mass resulting in a non-porous dry solid.

This gel structure is then immersed in water to enhance the effectiveness of syneresis action, a phenomenon by which the rubber particles tend to nest together seeking a condition of minimum packing, and also to prevent the formation of an air dried surface film. This step in the process also improves the quality of the product by leaching out soluble constituents. Because of the nature of this gel, shrinkage, unless restricted, takes place to the same degree in all dimensions, a vital point that distinguishes Kaysam from all other methods.

Kaysam Casting

The casting of rubber articles by the Kaysam process is performed by merely pouring the liquid composition into the desired mold or former. If stationary, it gels into a shape outwardly conformable to and identical with the cavity of the container. A semi-hollow object can be formed by gellation of the mix in a mold provided with an insert or core. Variations in thickness of any section of a molded object has no effect on gellation in the mold; the thickness is entirely controlled by the space between the mold and the core. If the mold comprises two or more parts assembled to form a complete en-

closure around the mix, the gel can be formed into a hollow seamless article, for example a hollow ball. This is accomplished by rotating the mold so as to permit the liquid to contact with every part of the interior. The wall thickness of a hollow article is controlled by the amount and concentration of the mix used and by the gyrations of the mold during gellation.

The following are typical examples of Kaysam castings.

Boots

For casting a boot a mold is used tooled inside to the exterior contour of a finished boot including the design or engraving of the sole, heel, etc. A core of relatively the final shape of the inside of the boot is set into the outer mold. These two main mold parts being alined by means of dowels, a suitable mix is poured to fill the space between mold and core. The mold is then allowed to stand until gelling occurs at room temperature, or preferably is heated by immersion in water to shorten the operating cycle. The mold is then taken apart, and the casting is washed and allowed to dry partially. It is then drawn on to a last previously wrapped with a boot lining and is allowed to shrink on to and assume the shape of the last. Bonding between the rubber and the lining is brought about by the inter-application of a suitable adhesive.

Soles

Casting shoe soles and heels in an open mold is similar to that of a boot except no cloth insert is used in the former, but metal washers are fitted to the mold in the latter. A large number of sizes and thicknesses of the product can be made from one size of mold by varying the amount or the concentration of the mix, or by both means together.

Hollow Articles

In the preparation of hollow articles such as toys or balls the mold is disassembled, and the requisite amount of mix properly sensitized is poured in, the mold closed, set into a rotating machine, and revolved about two or more axes in a steam bath or through hot water. The article builds up on the inside of the mold by the progressive deposition of the gel to form a uniform or controlled wall thickness. In the case of toy animals or hollow play balls the articles are washed, dried, and then vulcanized. In some cases, however, especially with balls, it is possible to produce an article much greater in diameter than its original cast size. This is accomplished by inflating the ball shortly after its removal from the mold, thus forming a hollow casting made in a six-inch mold, for example, into balls ranging from the mold size through those of a rugby or basketball bladder to that of beach balls or larger. As the ball is inflated its wall thickness decreases, but there is a gain in its unit strength.

Material Economy

By the Kaysam procedure an absolute reproduction of the finest and most detailed mold surface markings or engravings may be obtained. The engraver's art loses nothing of fineness in reproduction since shrinkage takes place during the drying of the gel, resulting in detail even finer than that in the mold.

If gelling is accelerated by the application of heat, and the operating cycle thus shortened, pre-heating of sections where the gel is to be thicker is sometimes resorted to, but neither this step nor the one of actual heating are prerequisites to the formation of a proper gel.

Regardless of the type of product being manufactured, waste is cut to negligible proportions, overflow is practically non-existent, the problem of using up vulcanized scrap is eliminated for most articles, scorching is avoided, material transportation and handling problems are boiled down to a matter of piping and pumping, and batching can be done—and is preferably done—in relatively large units.

Shrinkage

As previously stated, the uniform three-dimensional shrinkage made possible by the particular gel structure and drying principles of Kaysam furnishes the missing link that opens the way to produce every known type of rubber article directly from latex. In addition other articles will now give way to latex which either could not be made at all of masticated rubber methods or could be done only with great difficulty and exorbitant expense.

Mold design is simplified since press pressure is not required, and since undercuts may exist without presenting difficulties in the unloading operation.

The drying of this gel gives a final product that is an exact replica of the wet one except for size. Proportionately it is identical because drying of this reticulated structure proceeds from the interior. The distortion of thick and irregular articles attempted by porous mold or form deposition methods is due to agglomeration of the particles and to drying at the surface first. This is illustrated diagrammatically by the accompanying drawings of cylindrical and conical shaped articles, each of Kaysam and absorption methods.

There is thus a definite mathematical relation between the original and final dimensions of the Kaysam casting for any latex mix of known solids concentration. Therefore the size and the shape of a mold can be calculated from the known dimensions of the finished article and the components of the latex mix. Conversely the article size is also calculable.

Research Facilities

The discovery of the principles of this process constitutes an outstanding contribution to the accumulated knowledge regarding the habits and control of latex. The many advantages of latex articles have occasioned compelling interest on the part of rubber manufacturers despite its practical application limitations. With the removal of these limitations the additional advantages of economical manufacturing procedures will no doubt stimulate an even more rapid increase of latex consumption.

Time has not permitted the development of the exact operations that would be involved in the economical production of every kind of rubber product. The simple underlying principles, as briefly discussed in this article, however, are well in hand, and the Kaysam Corp. of America maintains a subsidiary research and commercial development laboratory and competent organization, the Rubber-Gel Products Corp., whose function is to perform just such specific application developments.

Titanox-B-30

Titanox-B-30 differs from Titanox-B only by containing 30% titanium dioxide instead of 25%. In the preparation of this pigment no modifications have been made other than increasing the titanium dioxide and thereby offering a greater value for the money. In each case the titanium is precipitated upon and coalesced with precipitated barium sulphate. Titanox-B-30 naturally has better color value and greater tinting strength than the regular Titanox-B, owing to the larger proportion of titanium dioxide present. In general physical and chemical characteristics other than those specifically mentioned are the same.

Continued Mechanization of Industry

G. F. Buxton [1]

MANY people today have a depressing fear of over-production. They feel that we have carried the development of automatic and semi-automatic machinery too far and have taken jobs away from working people. They seem to be getting an "over-mechanization complex." They are telling us that our productive capacity is getting in excess of our capacity to buy. They are fearful that we can manufacture faster than we could use the product even if we had the money to purchase it.

The Fear of Over-Production

They are persuaded that improvements in manufacturing facilities will tend to reduce the total number of people that can be employed. Instances are readily given to show where ten men with modern machines are getting out the same amount of production that used to be made with twenty men. Automatic devices may be named that enable one man or two men to do the work formerly done by the twenty.

It is argued that this highly mechanized production has greatly reduced employment and will continue to do so. Dr. F. E. Townsend has said that we must "face the fact of a permanent army of unemployed because of machine efficiency." Because of this he wants to supply one group of people with purchasing power created by the efforts of other people. Many others have similar fears and propose various ways of taking money from one group and handing it to other groups.

The purpose of this article is to suggest that such fears are unfounded and such schemes unnecessary. We may be out of economic balance at times. We may not have adequate distribution facilities to get our product into the hands of the people who could effectively use it. We may lack courage to develop new business. We may feel uncertain as to what limitations are to be put on new business development by men in our different governmental units or by men seeking political power to enable them to put over their Utopian schemes devised to remake our whole economic system. At times in the early history of certain industries employes fought the introduction of labor-saving equipment with the fear that their future employment was at stake with the substitution of machines for men.

But our economic troubles are not the result of past attempts at the mechanization of industry; and our future prosperity is not going to be held back by further improvement in machinery. We prefer to suggest that better times are to come largely because we are continuing to invent and utilize labor-saving schemes in manufacture.

Mechanization in the Rubber Industry

While it is true that machines do displace men at times, their influence has been, on the whole, greatly to increase employment. The automobile tire business is an example in the rubber industry of increasing numbers of workers being engaged in the manufacture and servicing of tires, as innumerable machines and mechanical improvements are not only increasing the output per man, but also bettering the quality of the product.

Prior to 1909 tires were made by manual labor. At that time tire building machines came into use in the United States. The following news extract of the April 1, 1909, issue of INDIA RUBBER WORLD is of interest when reflecting the significance of the tremendous increase in the use of tires beginning at that time, also the astounding increase in the number of people given employment in the years that followed, largely due to the increased output per man and the uniformly high quality of product that have resulted largely from the ever-improving tire mechanizations.

"Tire manufacturers are watching with interest the result of the completion by the Goodyear Tire and Rubber Co. of a tire making machine. The device was invented by F. A. Seiberling, president of the company, and after a long period of experimentation, the company has installed four of the machines. They are said to be capable of making perfect tires at the rate of fifty a day when operated by a workman of average skill. It is claimed that they will make large size tires as fast as those of smaller dimensions and afford an even tension throughout the construction. The officers of the company declare themselves satisfied with the results of the machines and are preparing to install four more. It has been understood for some time that the Diamond and Goodrich companies have also had their experts at work improving the foreign machines, but as yet no announcement from them has been made."

While the reduced cost and improved quality of tires cannot be given full credit for the expanding volume of automobile acceptance, beginning about 1909, it certainly is true that these factors had a marked influence in this direction. It is also to be noted here that to whatever extent this influence existed, to that same extent the improvement of tires contributed to increased employment in automobile manufacturing, selling, and servicing activities. An idea of these expansions is reflected by the total motor vehicle registration of 312,000 in 1909 as compared with that of 26,221,052 in 1935.

One needs but draw slightly on the imagination to realize that the automotive industry would be in very different proportions than it is today were it not for the contributions of the rubber industry as a whole. This can be said with equal truth of many other industries. Consider, then, the probable status of the rubber and other industries and the standards of living that would exist today had not Chaffee or some other inventor devised the mill and calender 100 years ago that have paved the way to the broad applications of rubber. Prior to these inven-

[1] Professor of industrial training, Purdue University, Lafayette, Ind.

tions the rubber industry consisted of a few people engaged in dissolving the unwieldy crude rubber in turpentine, then applying the resulting liquid to such articles as this limitation of manipulation permitted. Were it not for mechanical plastication of dry crude rubber the rubber industry would be of insignificant proportions.

Preparing for Prosperity

We have been so busy during the past few years considering ways of relieving present economic distress that we have failed to plan adequately for a prospective prosperity. In some cases we have so feared over-production that we have not given enough attention to the improvements in machines and production methods that will be needed when real buying starts.

It is a pleasure to note that certain far-seeing builders of factory equipment have been at work during the depression, giving their attention to developing new tools. Their engineering departments have been designing more satisfactory devices for speeding up production without lowering the quality of the article turned out. Tests and experiments have been carried on to perfect details so that when the demand appears, these makers of factory machinery will be ready for the New Emergency, that of satisfying a public hungry for new and better products and assured that better times are at hand. The machine tool builders may be helping to set the pace in getting ready for these better times.

Other industries are improving their products and actually getting a real selling program under way. The makers of automobiles and auto-accessories and those making household refrigeration and temperature-control equipment are illustrations of this movement. Through extensive advertising and display, people are being made conscious of the desirability of having new products providing better transportation out-of-doors and better living conditions indoors.

Confidence in the Future

A fear on the part of most business men has kept them from developing new business. New products, new machines, and new and better factory buildings are delayed because of the uncertainty as to future money values, possible taxing policies, and further laws affecting the control of manufacturing conditions, which may make a profitable production expansion program extremely difficult to organize. If the promoter of new business cannot see a likely profit in the venture, he will not risk either time or money in getting it under way.

It is not the fear of over-production through further mechanization that holds back business development and the reemployment of men who have been out of work the past few years. Mechanization of industry has nearly always made a demand for added employment soon after we have felt the first shock of "more production per man-hour." Temporary unemployment is sometimes noticed after an automatic high-speed tool is introduced to increase the quantity of goods sent to the shipping department. Soon after we get adjusted to the more rapid handling of such goods, we look back with a smile at the inadequate and clumsy way we used to do the job. We recognize now the impossibility of trying to satisfy the present demand with the old method.

There are always more needs to satisfy if we can locate and focus attention upon these needs. Many articles we think of as necessities are not yet universally used. There are goods that will last but few years and which need replacing; and there are wares for either household or business use which are considered as desirable, but too costly for common use, which may be more commonly purchased in the days ahead. There is no real over-production in most lines of manufacture, but there is a real under-consumption. A freak, unjustified over-expansion in the production of certain things sometimes takes place because the probable demand is over-estimated. With other things it is frequently under-estimated.

The farm, the forest, the mine, and other sources of raw materials for factory and mill can produce more and do this work more economically as more effective equipment is invented and more widely adopted. As the factory utilizes more effective equipment, it turns out its product more economically and in larger quantity to satisfy an increasing demand. As prosperity returns, this further mechanization will demonstrate its vital importance.

Market Is Not Saturated

A time may come when a few hours' work per week for comparatively few years of one's life will produce all the food materials and all the factory products the people will want to buy. But we are not at present in sight of any such condition. People want to buy or would be ready to buy more things than are now being made, but manufacturers and dealers hesitate and are uncertain as to the risk of going ahead with a larger production and distribution program.

The potential market seems almost unlimited, but the purchasing power is inadequate. A dependable purchasing power cannot be built up permanently by handouts, chargeable to present and future taxes. The purchasing power of the people must be developed through real values created by these people. There seems to be no satisfactory way for one man to earn a wage and then have a considerable part of it taken away and given to another man to spend.

Mechanization does furnish opportunity for more production with less labor, but we cannot afford to turn away surplus labor and create an enforced idleness. We must, rather, create new jobs for such labor so that they can also produce. We must use the new machines for more hours or purchase additional machines. We must find new things to make and discover or develop a new demand for the new things.

Machines Help Payrolls

Further mechanization provides further possibilities for inventors of new products, for tool designers, for employes in factories concerned with clerical jobs, with the purchasing and handling of extra materials, with the installation and maintenance of new machines, and with the packaging and warehousing of the finished product. The additional product furnishes further employment for many who are engaged in the distribution of the product all the way to the final customer through the various sales channels. These include not merely the sales people, but those engaged in wholesale and retail establishments in all the accounting and delivery occupations. All temporarily unemployed because of machine improvements cannot at any one time be immediately absorbed in industry. Many will permanently leave industrial for commercial occupations made possible because of the improved production of goods of better quality at lower prices. The trend during the last half-century has been continuously toward a much larger percentage of the population engaged in commercial occupations. An actual decrease in the total number of factory employes may cause or accompany a noticeable gain in the number of workers in other fields. Mechanization makes it possible

for more goods to be put on the market, but at the same time it makes it necessary for more people to be employed in related activities and thus provide more customers to purchase these goods.

Earnings Provide Capital

The movement back to normal will become more and more evident as men produce more, as they earn more and have more to spend, as they buy more and save more of their earnings for later and more costly buying. Larger purchases must come through the build-up resources of savings. These savings may become the capital for financing buildings, machinery, and new business. Mechanization makes it possible for more men to become prosperous and part owners of manufacturing establishments. It furnishes special opportunity for men of ability. It gives every man his chance.

There is no place for the loafer, and there is no reason for calling a halt on inventive ability. There is but little excuse for the able-bodied idler unless he has been unusually active in the past and through intelligence and thrift has accumulated a competence. In that case he may put his money to work for him. He supplies the capital that provides jobs for other people.

Kinds of Jobs Change

Mechanization is only apparently decreasing employment. It is really making a change in the kinds of work men do. If hand skilled work is made less necessary as we redesign the machine, we gradually move the best skilled mechanics from tool operating to tool making employment or to a higher grade of tool operation. In many cases we make the operator's work easier, while increasing the output. We do not usually decrease his daily earnings although we may change the method of figuring his rate of pay. Sometimes his wages are increased, and usually the lowered cost of the goods he purchases gives him an increased buying power.

The more automatic we make production, the more we change the nature of the work of the operator. We at first change a complex group of movements to a hand-lever-pulling or a button-pressing-and-observing operation. Then we may change to a dial-reading, clock-watching, temperature-checking operation. The operator's job is then to see that the product is following a standardized course through the special machine or apparatus. The operator keeps on the alert to stop the machine and make an adjustment when something goes wrong.

With the increasing tendency toward special tooling and automatic control, we find the need of a better trained group of men to plan and direct this work. Some of this force is being upgraded from the better machine operators; some of it comes from the engineering colleges. Always there are new opportunities for advancement into executive positions for the more ambitious and capable, who must otherwise handle routine work if we are not to look forward to business expansion through larger quantity output.

Causes of Unemployment

If we are to look for the causes of unemployment, we will find them centered in the destruction of values during the World War rather than in the increase of values through the productive efficiency of men and machines. We will also list prominently the lack of confidence on the part of business promoters unwilling to launch new lines of production until confident that their foresight, invention, organizing, and managing ability can make the business a success. They are unwilling to assume the risks of development and expansion unless they see the possibility of suitable returns on the investment if all goes well.

Sometimes unemployment seems to be due to a lack of new and practical ideas which may appeal to the buying public. Encouraging exceptions are seen in certain fields. New uses for hard rubber are appearing. More attention is being given to the rubber impregnation of fabric materials. The application of pneumatic tires to the various types of farming equipment opens a vast new field of endeavor. Various applications of sponge rubber are being marketed. The use of rubber in highway construction has possibilities. These are just a few samples in the rubber industry. Other industries are preparing for similar advances.

Neither the lack of ideas nor the courage to go ahead with them can be laid at the door of mechanization. But highly mechanized factories may be able to get such ideas into marketable form.

Another cause of unemployment is the seasonal character of many products. But mechanization cannot be held responsible for this cause.

The slowing up of buying is the immediate cause of unemployment, and much of this is due to a feeling that hard times are to be with us for some time; so we must hold on to what funds we have. A lack of vision on the part of business leaders tends also to shake the confidence of the buying public.

There are many causes of unemployment, and extensive mechanization must take its place as a part of the cause of temporary unemployment, but in the long run it corrects this by increasing permanent employment.

Reasons for Mechanization

Three reasons for continued mechanization may be stated as:

Promoting a higher standard of living, with more and better goods per individual buyer and a shorter amount of time spent by each worker in making such goods.

Opening up new lines of employment in the factory itself and in the coordinate fields of accounting, selling, and transportation.

Encouraging other lines of activity, putting more goods and more money into circulation, causing increased sales of other products, and thus promoting other manufacturing industries.

In perfecting machines for high-speed operation many other features are also developed. Work is standardized with sizes and other qualities controlled. It is realized that machines have to be operated by human beings and that machines must be made to fit people.

Machine parts are placed at convenient locations. Handles and wheels are made easy to move. Noises and unpleasant vibrations are lessened. Indicators are easy to read. Signals are installed where possible. Moving parts are guarded, and various safety features are installed. There are more labor saving features than there used to be.

Conclusion

Improved machinery may sometimes temporarily displace labor, but it soon creates added employment in related clerical and distribution channels. In many lines of industry it actually increases the number of machine operators after a short time.

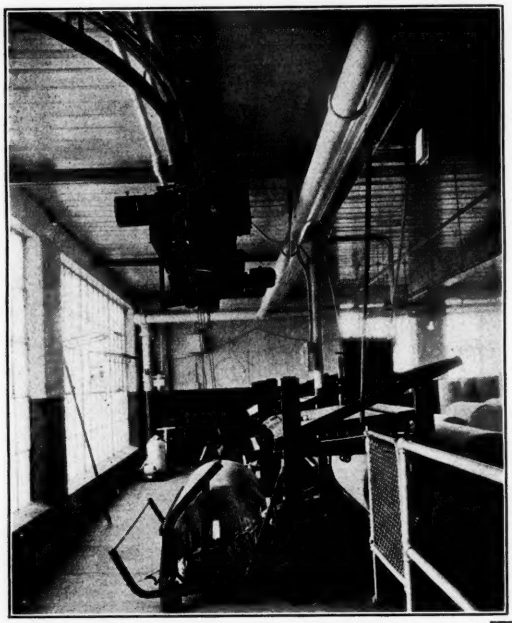
Labor-saving devices tend to lower the unit cost and the selling price of the product. The wider demand

(*Continued on page* 50)

A Handling System That's Almost Human!

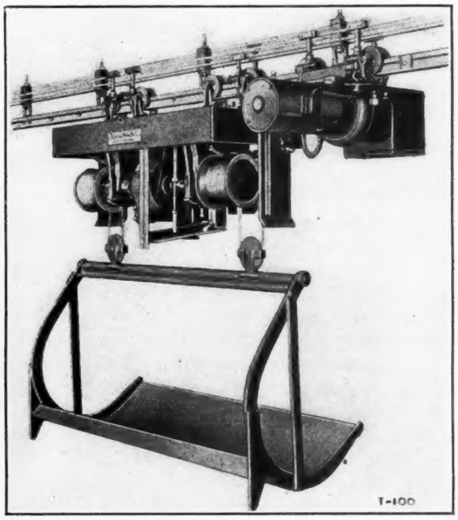
F. C. Harris [1]

FOR its initial objective in a campaign to simplify the handling of materials, the management of The Firestone Tire & Rubber Co., Akron, O., determined to reduce the cost of transferring finished rolls of tire fabric from the cloth room of its Gastonia mill to an adjoining warehouse. These rolls of fabric weigh from 650 to 1,000 pounds and measure 60 inches maximum length and from 24 to 30 inches in diameter. From 100 to 150 rolls are woven in an eight-hour day and, when weighed and graded in the clothroom, must be transferred to the warehouse to be held until released by the laboratory where tests are made with samples from each roll. This transfer, formerly handled manually on two-wheel trucks crossing under a railroad siding and climbing to higher level, required travel of nearly 1,000 feet.



Special Loading Table with Roll of Tire Fabric Being Picked up Automatically by Carrier for Delivery to Warehouse, Firestone Tire & Rubber Co., Gastonia, N. C.

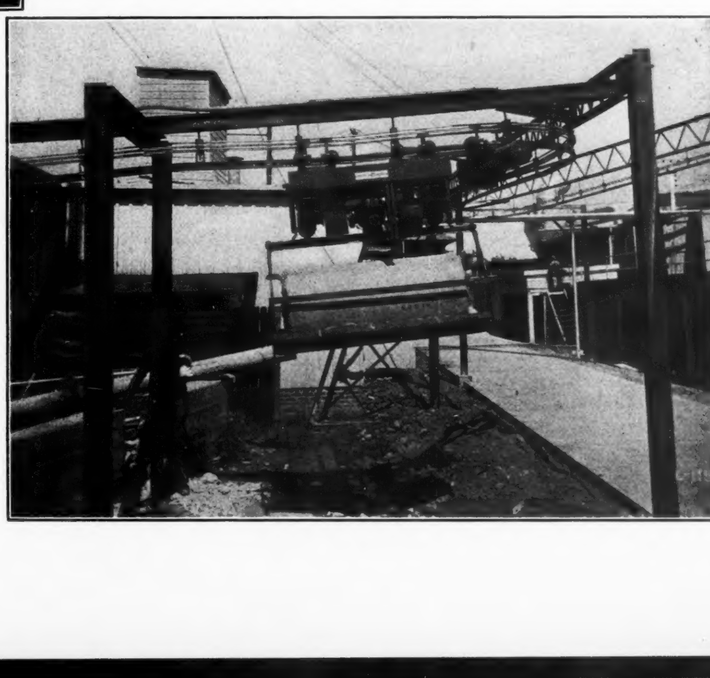
In designing a mechanical system to do the job, although the distance was reduced to about 300 feet, these same grade difficulties had to be overcome, together with a headroom problem at two double-decked loading tables where rolls were to be picked up. Special controls were required to accomplish complete automatic pick-up from either of the two loading tables and selective distribution to eight delivery stations, seven in the warehouse and one at a truck loading platform between the two buildings. Means were later required to permit reversing the action for delivery from the warehouse to an elevator in the cloth room for loading cars on the railroad siding.



Automatic Carrier Consisting of Special Cradle, Twin Drum Hoist with Slack and Limit Switches and American MonoTractor Drive Unit

To meet the complex requirements of such an automatic carrying and distributing system, The American MonoRail Co. made adaptations of its present MonoRail carrying equipment and designed additional controls and devices to meet the demands. The equipment consisted of two special double-decked devices for

[1] Chemical engineer, The American MonoRail Co., 13107 Athens Ave., Cleveland, O.



Carrier Climbing a 9% Grade over the MonoRail System from Mill to Warehouse, Firestone Tire & Rubber Co., Gastonia, N. C.

automatically loading rolls on to the carrier, a cradle-type roll carrier with electric hoist and standard Mono-Tractor drive unit, a special control panel together with limit switches and other controls, and the regular Mono-Rail electrified track equipment with supports.

Automatic Loading Device

From the looms the rolls of fabric are placed on tables running the length of the room and are moved along to a scale where they are weighed, wrapped, and rolled along to the loading tables which are inclined sufficiently to permit partial gravity feed into toggle and lever automatic loaders. When the carrier lowers its cradle and registers against a bar, it trips the levers and releases a single roll into the cradle and at the same time prevents the next roll from going forward. Then the carrier cradle raises its load, and the toggle goes back to its original position to receive the next roll in line. Provision is made for the same action over both upper and lower tiers of rolls, but at the present time only the lower is operated.

Dispatcher Panel

The dispatcher panel is the center of control for the entire carrying system. It is arranged with a series of 40 horizontal bars, each having two sliding square bakelite selectors; one on the right moving only one place to the left or right indicated "A" and "B." The other selector moves eight places, with an additional position marked "S" for stop. Seven places are for delivery to warehouse stations, and one marked "P" is for a truck loading platform. The right-hand selector controls pick-up from either loading table "A" or "B."

Normal use of the dispatch panel is as follows. Before starting the system the operator raises the horizontal indexer shown in back of the horizontal bars to the top of the panel with the crank on the top of the right side of the panel. He then starts with either table, setting the right-hand selectors to pick-up from that table, and the left-hand selectors for the proper unloading point, continuing for the number of rolls to be carried. After he has set up the required number of trips for that table he continues down the panel for the other table, putting the right-hand table selector in the other position. As many as 40 rolls can be dispatched and selectively distributed from one setting of the controls.

After setting the panel for as many trips as required, the operator then starts the system by turning the switch on the left side of the panel to the "Start" position. Carrier then goes through each cycle of operation indicated on the panel, picking a roll from the selected table and depositing it in the warehouse at the selected station, returning again for another and continuing as far as controls are set up.

A "Stop" position is included on each horizontal bar in the panel so that the operator can set up a desired number of trips and then have the carrier stop as it finishes these trips and at the same time light a signal on top of the panel to indicate that it is ready for resetting.

Automatic Carrier Unit

The automatic carrier unit consists of a cradle-type carrier built to contain various-size rolls and to unload by gravity upon striking a tipping bar. It is attached to a twin drum hoist equipped with specially designed spring roller guides to keep cables in the drum grooves when slack.

For automatic operation special switching and reversing controls operate the hoist and start the MonoTractor drive on its trips. The travel is accomplished by the use of the MonoTractor, a recent development by the American MonoRail Co. The MonoTractor consists essentially of a gear motor unit with a special rubber tire mounted on the output shaft, all being supported by a simple frame and trolleys. The rubber drive wheel is inflated against the bottom of the rail, and with the 1½ h.p. motor effective and simple traction is obtained to climb the 9% grade in this MonoRail system. Further, it makes accurate stopping and registry within plus or minus 1½ inches at loading and unloading stations easy to maintain.

"What Is International Committee's Policy in Regard to Prices?"[1]

THE *Financial News* of August 31, under the title quoted above, states in part:

"The present price of rubber and the present rate of release of supplies probably leaves only a slender margin of profit except to the most favorably placed estates. It is believed, therefore, that a strong case can be made out for a more determined use of restriction and for the establishment of prices at a much higher level than that now ruling. Some observers consider that a price of 8½d. to 9d. a pound is the absolute minimum if the clause in the restriction agreement, which demands the achievement of a price 'reasonably remunerative to efficient producers' is to be satisfied. If the Committee regards the present price of rubber as satisfying this clause, then, it is said, the Committee's idea of what constitutes an efficient producer is out of line with the facts.

"Of course, the phrase 'reasonably remunerative to efficient producers' covers a good deal of ground, and gives a considerable amount of latitude to the Committee charged with administering the provisions of the agreement. The phrase, according to the interpretations of different parties, might well cover any price from 7d. to 10d. What is important, however, is not the interpretation put on the phrase by producers, shareholders and the like, but that adopted by the Committee. And it is clear enough that the Committee's views on this matter are much more moderate than those of shareholders. It is apparent from the higher quota fixed for the last half of this year that the Committee does not yet subscribe to the views of those who regard 9d. as the desirable price. The Committee obviously has no intention of allowing the price to go to that figure under existing conditions, and these conditions are not likely to be modified in the near or fairly distant future in such a manner as to justify the Committee in an upward revision of its conception of the ideal price.

"Over the next year or so the reduction of stocks will probably permit a gradual advance in the exportable percentage of the standard allowances. This expansion in quotas may well permit some reduction in costs, and should certainly preclude the possibility of a further rise. There is no question that the larger quotas which will probably be in force a year hence will alone lead to a fairly substantial increase in profits, even if there should be no improvement in prices; and there are few grounds for

(*Continued on page* 53)

[1] Circular No. 3,620, Rubber News Letter, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Synthetic Rubber

Joseph Rossman, Ph.D.

THE following abstracts of United States patents dealing with synthetic rubber continue the informative article from our September issue.

110. Patrick, 1,962,460, June 12, 1934. (Reissue, 19,-487, Mar. 5, 1935.) This patent covers a composition comprising halogenized rubber and a highly sulphurized compound resulting from the interaction of soluble polysulphides with ethylene dichloride.

Example: 100 parts the highly sulphurized products resulting from the interaction of soluble polysulphides with organic compounds containing methylene or substituted methylene groups, one or more of which are linked to a negative radical or radicals, ten parts zinc oxide, five parts rubber, ten parts gas black, 0.5-part diphenylguanidine, 0.5-part sulphur, two parts zinc chloride, and 0.5-part stearic acid were thoroughly mixed on a rubber mill, and the compound was cured at 287° F. for 50 minutes. A test strip of this compound, treated with gasoline at 120° F. for a month, showed no measurable increase in length. It could be stretched 450% without rupture and caused no noticeable discoloration of the gasoline. The same results were obtained in benzene, except that there was a 1½% increase in elongation.

111. Ellis, 1,964,725, July 3, 1934. To make a plastic containing sulphur in combination react on the mixed aldehydes of petroleum oxidation with an alkaline polysulphide.

112. Carothers and Berchet, 1,965,369, July 3, 1934. This process comprises subjecting a mixture of chloro-2-butadiene-1,3 and a compound taken from the class consisting of dichloro-2,3-butadiene-1,3 and trichloro-1,2,3,-butadiene-1,3 to conditions which will effect polymerization, discontinuing the polymerization while a substantial portion of the starting material still remains unpolymerized, and removing the unpolymerized material from the reaction mixture, then subjecting the plastic polymer to further polymerization to obtain a material resembling cured natural rubber.

113. Carothers, Collins, and Kirby, 1,967,860, July 24, 1934. Example 1: equal parts of benzene and chloro-2-butadiene-1,3 are mixed and allowed to stand in a closed container in the presence of a little air at the ordinary conditions (summer temperature). After 16 days about 36% of the chloro-butadiene has polymerized, and the mixture has set to a clear, soft, transparent jelly. When this is spread on a flat surface and freely exposed to air, the benzene and the unchanged chloro-butadiene evaporate and leave a coherent film of rubber-like product. When fresh, this film dissolves completely in benzene, but after standing for one day it is no longer dissolved, but only swelled by benzene.

Such jellies as this one may be diluted with benzene to yield less viscous solutions, or they may be concentrated by partial evaporation to yield stiffer jellies, and either before or after dilution or partial evaporation they may be mixed with antioxidants or other materials adapted to stabilize the product and to protect it from the action of the air.

The solutions may be used directly as cements, or as coating compositions, or impregnating agents. Thus if a piece of cloth is soaked in such a solution and then allowed to drain and dry, it is coated with a film of strongly adhering rubber-like polymer.

Example 2: such solutions may also be used as a source of rubber-like polymer at once elastic, plastic, and soluble and capable of being fabricated or redispersed in organic solvents, to give solutions of rubber-like polymer free of unchanged chloro-2-butadiene-1,3. Thus a sample of chloro-2-butadiene-1,3 is mixed with twice its volume of benzene, and the solution allowed to stand in a closed container for about five weeks until about 25% of the chloro-butadiene has polymerized. The resulting soft transparent jelly is mixed with 0.5% of its weight of phenyl-alpha-naphthylamine, and the benzene and unchanged chloro-2-butadiene-1,3 are removed by distillation. The residue is rubber-like, plastic, quite elastic, and completely soluble in benzene. It may be rolled out into a sheet and then allowed to stand when it shows only a very slight tendency to contract. After three days the plasticity is lost, and the material no longer dissolves in benzene. It slowly hardens to a tough, elastic mass.

114. Collins, 1,967,861, July 24, 1934. Four hundred grams of water containing eight grams of sodium oleate in a suitable container are rapidly stirred by a mechanical stirrer, and 400 grams of chloro-2-butadiene-1,3 slowly added. A homogeneous emulsion results. After about one-half hour the temperature of the mixture begins to rise, owing to the heat of polymerization. To avoid losses due to evaporation the mixture may be cooled by immersing the containing vessel in an ice bath to keep the temperature below 30° C. Stirring may be interrupted shortly after the temperature has begun to rise or as soon as a permanent emulsion is obtained. The uniform emulsion is allowed to stand for two to eight hours. The resulting suspension of completely polymerized chloro-2-butadiene-1,3 is a white, milk-like liquid in which the particles show a distinct Brownian movement when viewed in the ultra-microscope. This latex, when allowed to evaporate in thin layers, preferably on a porous plate or other form, yields a light-colored, odorless, transparent or translucent film highly elastic, non-plastic, and insoluble in benzene and closely resembles vulcanized rubber. The coagulation of the latex with dilute acetic or other acids yields a dough-like, somewhat plastic, white mass containing much water. As the water is removed by pressure or evaporation, the product loses its plasticity and becomes elastic like vulcanized rubber. The stability of the latex toward coagulation may be increased by the addition of alkali, and the stability of the rubber obtained therefrom toward atmospheric oxidation may be increased by adding antioxidants.

115. Konrad and Tschunkur, 1,973,000, Sept. 11, 1934. Fifty parts by weight of butadiene or isoprene and 17 parts by weight of acrylic acid nitrile (CH_2—CH—CN) are emulsified with 60 parts by weight of a 5% aqueous solution of the hydrochloride of diethylaminoethyloleylamide and 0.5-part by weight of trichloro acetic acid and polymerized for three to four days at 50 to 60°

C. with agitation of the emulsion. Produced in quantitative yield is a polymerization product which can be worked up on the rollers and yields, for example, in admixture with soot vulcanization products of high strength.

116. Beyer, 1,984,246, Dec. 11, 1934. The method of making a caoutchouc-like material comprises mixing starch with sufficient water to wet and swell the starch grains, adding an aqueous solution of zinc chloride to the resulting mass, inducing active fermentation of the mass while maintained at temperatures not substantially higher than room temperatures by incorporating a yeast ferment therein, whereby in the course of the fermentation a caoutchouc-like material is formed and coagulated within the mass, and recovering the coagulated caoutchouc-like material from the mass.

117. Brooks 1,988,479, Jan. 22, 1935. A process of making a rubber-like material comprises separating a fraction from a mixture of hydrocarbons, containing mono- and diolefines, the olefine content of which fraction consists predominantly of mono- and diolefines of four to five carbon atoms to the molecule, contacting the fraction with finely divided solid cuprous chloride dispersed in an aqueous solution and adapted for forming a compound with the diolefines and separable from the mono-olefines, thereafter regenerating diolefines by dissociating the compound, collecting the regenerated diolefines and polymerizing them, thereby forming a rubber-like material.

118. Beck and Mueller-Cunradi, 1,991,367, Feb. 19, 1935. Two thousand parts of a liquid of the character of rubber latex, prepared by polymerizing an aqueous emulsion of butadiene in about 10% by weight of butadiene of ammonium oleate with the aid of 2% of an aqueous 10% hydrogen peroxide solution, and containing 10% polymerization product, are stirred 15 minutes with four parts of sulphur, eight parts of di-cyclohexylamine dithiocarbamic di-cyclohexylamine, and 140 parts of American gas black, these additions having been first wet with some quantity of the above latex liquid. The mixture, still dispersed, is then coagulated with acetic acid; the coagulate is washed in the washing roller, and finally dried at a temperature not exceeding 100° C. Vulcanization products can be obtained by heat-pressing the mixture for an hour at 151° C., if desired, after adding about ten parts each of colophony and of the oily, bituminous softener "Kautschol."

119. Patrick, 1,996,487, Apr. 2, 1935. Example: to one liter of a suitable polysulphide are added 96 grams of furfuraldehyde; the mixture is suitably agitated, preferably using mechanical agitation. The reaction mixture may be heated to about 70° C. with advantage as such moderate heating greatly accelerates the process and does no harm. The time may be shortened by increasing the temperature, but danger of decomposition arises if the temperature is too high. Lower temperatures than 70° C. may be used, but require longer time. The best time is about five hours at 70° C. and, although the reaction is not chemically complete at that time, the formation of the gum-like reaction product has substantially ceased. The rate of the reaction and the degree of completion of the reaction are much improved if a considerable concentration of methyl or ethyl alcohol is present in the reaction mixture and the reaction vessel is connected with a reflux condenser. The product resulting from the reaction is sticky. It may be separated from the reaction mixture and repeatedly kneaded and washed with water until substantially free from soluble matter, during which procedure it acquires a much firmer and more elastic character.

120. Ebert, Fries, and Garbsch, 2,008,491, July 16, 1935. The process for the polymerization of butadiene comprises adding 1% by weight of a vinyl ether to butadiene and polymerizing with sodium at 40° C.

Example: 100 parts of butadiene and one part of vinyl ethyl ether are caused to react in a pressure-tight tinned iron autoclave with 0.25-part of sodium. The temperature amounts to about 40° C. The polymerization commences immediately and is completed after about 1½ days. The product obtained is said to yield excellent products when vulcanized.

121. Patrick, 2,012,347, Aug. 27, 1935. The method of producing a plastic comprises reacting upon a methylene compound of the group consisting of methylene dihalide, formaldehyde, hexamethylenetetramine, and olefine dihalides with a solution of a water soluble polysulphide in the presence of a dispersing agent for the reaction product and a protective colloid, thereby forming a dispersion of the organic substance-polysulphide plastic containing such protective colloid.

122. Baer, 2,039,206, Apr. 28, 1936. A process of manufacturing an elastic caoutchouc-like body consists in heating a solution of an alkaline polysulphide with formaldehyde.

Part II

The following patents deal with the preparation of substances or mixtures which can be used as a substitute for rubber, but which do not have all the properties of natural rubber.

1. Loewenberg, 46,060, Jan. 24, 1865. A substitute for rubber consists of glue, four pounds; acetic acid, one-half pound; glycerine, four ounces; nut-gall, two ounces. The acetic acid is diluted in about five parts of water, and the glue is added. When the glue is dissolved, the other ingredients are added.

2. Bond, 57,468, Aug. 28, 1866. A composition possessing all the properties of hard vulcanized rubber and adapted to all the purposes for which it is used, as the manufacture of combs, buttons, etc., consists of borax, shellac, glue, flour, linseed oil, and molasses, to which may be added emery or other similar material, according to the articles to be produced. To dissolve the shellac a concentrated solution of borax is made; and when the shellac is dissolved, the glue, which may be previously soaked in water, is added, and then the molasses and the other ingredients.

3. Day, 58,615, Oct. 9, 1866. The process consists in mixing, heating, and sulphurizing vegetable and mineral oils, in combination with gum resins and resinous compounds, to form a composition to be used as a substitute for rubber. The process of mixing the ingredients is commenced by fixing on the oils to be used. In most cases a cheap vegetable oil will be selected, as linseed, cottonseed, rapeseed, hempseed, or any other vegetable oil; and having mixed two or more in certain proportions and heated them to the required temperature, say 300° F., add the resinous bodies and the sulphur, heat to 260° F., then increase the heat to 300° or higher until sulphurization takes place. If in mixing and heating the oils and hydrocarbons, carbon separates to the bottom, the liquid part is poured off before the sulphur is added.

The following are specimens of compositions worked by the process.

A: two parts, by weight, linseed oil; one part cottonseed oil; two parts petroleum; two parts raw turpentine; two parts sulphur; time, one hour.

B: two parts linseed oil; one part castor oil; two parts liquid coal tar; one part petroleum; two parts raw turpentine; two parts sulphur; time, 30 minutes.

C: two parts linseed oil; one part cottonseed oil; one

part peanut oil; three parts light coal tar; one part petroleum; one part spirits turpentine; one-half part crude turpentine; four parts sulphur; time, 35 minutes.

D: one part cottonseed oil; two parts linseed oil; one-sixth part caoutchouc or gutta percha; two parts heavy petroleum; two parts light coal tar; one-half part raw turpentine; one part spirits turpentine; two parts sulphur; time, about one hour.

4. Colburn, 67,025, July 23, 1867. A composition for making dental plates is composed of gum-shellac, asbestos, zinc oxide, sulphur, and chalk. These ingredients are put into a mortar, pulverized, then fused or melted together.

5. Newbrough and Fagan, 69,470, Oct. 1, 1867. A composition comprises stearine or margarine, and sulphur, gum-copal, or other suitable material. Sulphur is melted and, while at a low temperature, is mixed with about one-half its weight of stearine or margarine; the two, maintained at a low temperature, are constantly stirred until thoroughly combined. The compound is then allowed to cool and harden; then it may be remelted and cast or molded into any required form.

6. Day, 210,406, Dec. 3, 1878. To make crude kerite compounds combine clay or other equivalent earths with vegetable or mineral oils, resinous body or bodies, and sulphur. A product may be obtained with 27 pounds of cottonseed oil, 30 pounds of coal tar, 27 pounds of linseed oil, 15 to 18 pounds of sulphur, and about five pounds of clay or other equivalent earth. The cottonseed oil, the coal tar, and the clay are first mixed together in a suitable separate vessel and heated up to about 300° F., or higher, until thoroughly united. The mixture is next strained and cooled down to about 200° F. When the temperature reaches this point, the linseed oil is added, and the mixture heated to about 220° F.; and when the materials are in a homogeneous condition, sulphur is added. The compound is then cooled.

7. Day, 210,408, Dec. 3, 1878. The vulcanized compound composed of vegetable or mineral oils, a resinous body or bodies, and sulphur, are prepared by the process of patent No. 210,406.

8. Day, 210,411, Dec. 3, 1878. To make a vulcanized compound combine and treat cottonseed oil, coal tar or its equivalent, linseed oil, and sulphur.

9. Haug, 305,184, Sept. 16, 1884. A substitute for gutta percha or caoutchouc is manufactured by boiling skins and glycerine under pressure, mixing with the mass so obtained glycerine and chromate or bichromate of potash or other suitable salt acted on by light, with or without the addition of ground cork, ox gall, and color, according to the different purposes for which it is intended.

10. Day, 322,802, July 21, 1885. The process of making vulcanized crude kerite consists in first mixing together and heating cottonseed oil and coal tar or bitumen and afterward adding linseed oil and sulphide of antimony or other suitable sulphide, the latter either alone or united with a greater or less proportion of sulphur.

11. Day, 322,803, July 21, 1885. The product consists of a crude kerite compound formed by the mixture of cottonseed oil, linseed oil, coal tar or bitumen, and the sulphide of antimony or other suitable sulphide.

12. Day, 322,804, July 21, 1885. The process of manufacturing crude kerite compounds consists of combining one or more vegetable astringents with vegetable oils, coal tar or bitumen, and sulphur or a sulphide, or both the latter together.

13. Day, 322,805, July 21, 1885. The product consists of a crude kerite compound formed by mixing vegetable astringents with cottonseed oil, linseed oil, and coal tar or bitumen.

14. Kissel, 350,459, Oct. 5, 1886. A rubber substitute is made by hardening resins and balsams by means of caustic lime or other caustic alkaline earth, dissolving the hardened resin or balsam in oil, adding to the solution so formed a second solution of sulphur and oil, adding sulphur to the mixed solutions, and heating the entire mass.

15. Allen, 355,751, Jan. 11, 1887. A moldable composition is composed of carbonized or gelatinized fiber, asphalt, resin or equivalent substance, and non-volatile oil.

16. Siebert, 411,171, Sept. 17, 1889. A gutta percha substitute consists of a mixture of asphalt, balsam of sulphur, and an easily melting solid hydrocarbon. Balsam of sulphur is prepared from 19 parts of rapeseed oil and six to eight parts of sulphur, at a temperature of about 150° C. In place of rapeseed oil any other fatty oil can be employed. To the balsam of sulphur are added eight to fifteen parts of paraffin; but this may also be added after the balsam of sulphur has been mixed with the asphalt, accomplished while the latter is melted. The mass is then left to cool and put aside to settle for about six to eight weeks.

17. Blandy, 522,312, July 3, 1894. A rubber substitute is manufactured by mixing together linseed oil, bisulphide of carbon, and sulphur chloride, gently heating the mixture, then incorporating asphalt therewith, heating the product, incorporating rubber, a metallic oxide, and sulphur, and finally vulcanizing the resultant mass.

18. Pattigler, 525,086, Aug. 28, 1894. A composition consists of vegetable or mineral oil, caoutchouc, zinc white, soluble glass, minium, asbestos, and coloring matter.

19. Griscom, Jr., 529,727, Nov. 27, 1894. A vulcanizable compound is composed of animal fat candle tar and sulphur.

20. Griscom, Jr., 529,728, Nov. 27, 1894. A vulcanizable compound consists of substantially equal parts of animal fat candle tar and a residual product from petroleum distillation, and sulphur, in proportions of from 2 to 8% of the mass.

21. Fenton, 599,694, Mar. 1, 1898. A process for manufacturing artificial gutta percha consists in taking an oxidizable vegetable oil either in the raw state, or more or less oxidized, and mixing therewith tar or other pyroligneous substances, and then placing the product in a bath of diluted nitric acid to form a magma or base. The proportions of tars, pitches, creosotes, or other forms of pyroligneous acids may range from 5 to 75% of the oils used by weight, the higher range of percentage being used in forming gutta-percha-like substances and the lower, say from five to fifty, in producing the more elastic rubber-like forms of the article.

22. Leonard, 615,863, Dec. 13, 1898. To produce a rubber substitute mix 76% corn oil, 21% sulphur, and 3% paraffin; heat the mass until the oil is vulcanized or vulcanization begins; then shut off the heat and allow the vulcanization to continue until complete and the mass to cool.

23. Leonard, 615,864, Dec. 13, 1898. To make a rubber substitute mix corn oil and castor oil with chloride of sulphur, naphtha, and oxide of magnesia.

24. Ives, 623,608, Apr. 25, 1899. The process of producing from a composition of gelatin, glycerin, and bichromate of potash a substance of rubber- or gutta-percha-like character consists in mixing the ingredients in as nearly an anhydrous state as possible, whereby the chemical action set up between the bichromate of potash and the gelatin is sufficiently inactive to allow time for

(*Continued on page* 50)

Attaching Rubber to Metal

HERETOFORE the customary method of attaching rubber to metal, etc., was to apply hard rubber and intermediate rubber cements to the surface of the articles and to dry the cements in succession as applied. Such preliminary coats of rubber provide a bond between the material being coated and a subsequent sheet of rubber applied over the dried cements to form the major portion of the rubber coating. This method is difficult to carry out, requires much skilled labor, and not infrequently the results are unsatisfactory.

A patented method[1] for permanently coating objects of metal, wood, or cement consists in coating the article with the usual basic hard rubber cement, the usual intermediate rubber cement, and over the latter applying a coat of rubber from latex compounded or uncompounded or an artificial water dispersion of rubber. The details of the process follow.

The iron article is first thoroughly cleaned by sanding and cleansing with concentrated sulphuric acid containing a small percentage of potassium bichromate. After cleansing, the solution is thoroughly washed from the surface, and the article is dried ready for successive coatings of cements of the following compositions:

BASIC HARD RUBBER CEMENT

	Parts by Weight
Smoked sheet rubber	50
Spray dried latex	50
Zinc oxide	75
Lime	10
Magnesium oxide	75
Tetramethyl-thiuram-disulphide (accelerator)	10
Dibenzylamine	10
Sulphur	60
Aluminum powder	25
Phthalic anhydride	0.25
Acetaldehyde condensation product (antioxidant)	3 c.c. per gal.
Carbon bisulphide	10

INTERMEDIATE RUBBER CEMENT

	Parts by Weight
Smoked sheet rubber	50
Spray dried latex	50
Zinc oxide	75
Lime	10
Dibenzylamine	10
Sulphur	60
Phthalic anhydride	0.25
Acetaldehyde condensation product (antioxidant)	3 c.c. per gal.
Carbon bisulphide	10

These mixings are each made up into independent cements by dissolving two pounds of mixing in one gallon of solvent naphtha, gasoline, or carbon tetrachloride. Coating the article with these cements is done by dipping, brushing, or spraying. In any event each coating of cement is thoroughly dried before the next is applied. The iron surface thus cemented is coated with the final layer of rubber by immersing the surface in a latex mixture of the following composition:

OUTER RUBBER COATING

	Parts by Weight
Rubber (as latex twice creamed with pectin and diluted to 35% solids)	100
Zinc oxide	10
Nekal	1
Talc	13
Ammonium thiocyanate	0.1
Glue	1
Sulphur	2.7
Heptaldehyde-aniline condensation product	2
Carbon black	5

The solids of this formula may be emulsified and added to the cream latex, and sufficient water added to the mixture to bring the total solid content to approximately 35%.

Another formula for the outside rubber coating follows:

	Parts by Weight
Rubber (as latex twice creamed with alginate, semi-cured, and diluted to 35% solids)	100
Zinc oxide	2
Carbon black	3
Sulphur	7.5
Ammonium thiocyanate	0.1
Nekal	1 c.c. per 100 c.c. of mixture
Sodium polysulphide	0.4

The solids of this formula are added to the latex, and a sufficient amount of water added to reduce the concentration to approximately 35% total solids.

In the above formulae the Nekal is a condensation product of an aromatic hydrocarbon with an aliphatic alcohol in the presence of sulphuric acid and acts as a preservative of latex and it also serves to increase the penetrating power of the latex.

The article, after immersion, is withdrawn from the dispersion and allowed to drain and run smooth. It is dipped then into a coagulating solution of 50% acetic acid and alcohol. Other methods of causing coagulation may be by subjecting the film of dispersion to the action of heat or of coagulating vapors.

The thickness of rubber deposited from the water dispersion is determined by the duration of the immersion and may be as much as 1/16- to 1/8-inch in thickness.

After coagulation the surface of the deposited rubber is thoroughly washed with water, dried, and cured.

Many objects, as exhaust fans, housings, pipes, open and closed head metal drums, metal parts for refrigerators, brake bands, electrodes, cleaning racks, castings of various shapes, perforated sheet metal plates, wires, bowls, tumbling barrels, etc., have been coated successfully by this process.

The above process may be applied to other metals than iron and to wood and cement, in which case the basic cement may be varied somewhat as indicated by the following formulae for the basic rubber cement used for coating (1) copper or brass and (2) aluminum.

	(1)	(2)
Smoked sheet rubber	50	50
Spray dried latex	50	50
Zinc oxide	75	75
Magnesium oxide	75	75
Lime	10	10
Tetramethyl-thiuram-disulphide	10	10
Dibenzylamine	10	10
Sulphur	48	60
Golden antimony	74.1	..
Powdered iron	..	72
Phthalic anhydride	.25	.25
Acetaldehyde aniline condensation product (antioxidant)	3	3
Carbon bisulphide	10 c.c. per gal.	10 c.c. per gal.

Two pounds of the above compound thoroughly mixed and broken down on the mill are mixed with one gallon of solvent naphtha or any other suitable solvent such as gasoline or carbon tetrachloride.

[1] U. S. patent No. 1,896,263, Feb. 7, 1933.

Accident Experience in the Rubber Industry during 1935[1]

PLANTS in the rubber industry made creditable progress in reductions of both accident frequency and accident severity during 1935, as compared with 1934, according to reports of the National Safety Council. These reports have been assembled from 43 rubber manufacturing companies whose employes worked 118,038,000 man-hours. The 1935 average frequency rate of 7.21 (the number of disabling injuries per million man-hours of exposure) is 8% below the rate for 1934; and the corresponding average frequency rate of 0.53 (the number of days lost per thousand man-hours of exposure) is 35% below the 1934 rate. These rates compare very favorably with rates for the entire industry, since the average frequency rate among 30 major industries reporting to the Council is 14.02 and the average severity rate of the same industries is 1.58. Thus the rubber industry ranks fourth in frequency and fifth in severity among all industries. The frequency of disabling injuries has decreased 72% since 1926 in comparison with a reduction of 61% for all industries; and in severity, the improvement is 69% against an average reduction of 43% for all industries. 1935 frequency rates are lowest in large units, but small plants had the best records in severity. Large plants had the best experience in comparison with 1934.

Manufacturers of footwear have the lowest rates in the industry, averaging 3.60 for frequency and only 0.34 for severity. Plants manufacturing mechanical rubber goods, however, made the best showing in comparison with 1934 by reducing frequency 15% and severity 66%.

The most important types of compensable accidents in the rubber industry, according to state reports, are "handling objects" and "machinery" which account for 31% of all types.

Rubber companies improved their standing in frequency in comparison with other industries in 1935. Frequency is now 49% below the 1935 average for all industries; severity is 66% under the all-industries rate. The industry has exceeded the pace of others in improving its injury experience. The improvement in frequency since 1926 is 11% more than the average reduction by all industries, and the decrease in severity is 26% larger.

Industry	—Frequency Changes— 1934 to 1935	1926 to 1935	—Severity Changes— 1934 to 1935	1926 to 1935
Rubber	— 8%	—72%	—35%	—69%
All Industries	—10%	—61%	—11%	—43%
Textile	—22%	—47%	+14%	+33%
Chemical	—13%	—64%	—44%	—51%
Tanning and leather	— 4%	—40%	—51%	—16%
Automobile	— 7%	—37%	—12%	— 9%

All types of injuries have decreased in both frequency and severity since 1926. The largest improvement has been made in reducing the frequency of fatalities. While permanent partial disabilities have decreased only 13%, their severity has dropped 54%.

Type of Injury	Frequency 1935 Rate	Frequency % Reduction since 1926	Severity 1935 Rate	Severity % Reduction since 1926
Death and permanent total	.02	86%	.12	86%
Permanent partial	.49	13%	.20	54%
Temporary	6.70	73%	.21	33%
Total	7.21	72%	.53	69%

Small plants, on the whole, failed to equal the results in large units. While small units had lower severity rates, their frequency rates averaged over 90% higher than the rate for large plants.

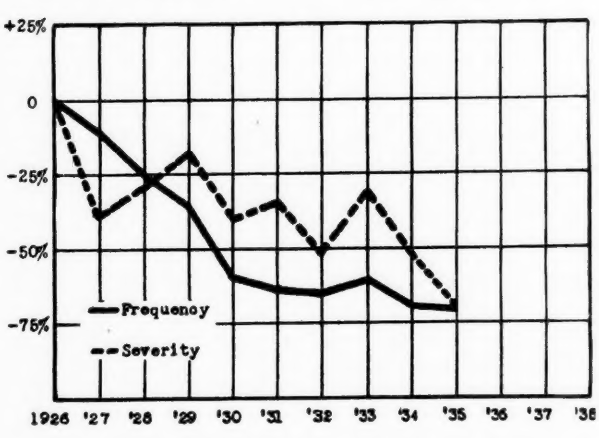
Tire manufacturing plants had the worst records for 1935, averaging 8.24 for frequency and 0.61 for severity.

Credit for achieving the largest reductions over 1934

I AM IT

I am Mr. Rush Job. I belong to no age, for men have always hurried. I pervade all human endeavor. Men believe me necessary, but I am not. I rush today because I was not planned yesterday. I demand excessive energy and concentration. I over-ride obstacles, though at great expense. I illustrate the old saying, "Haste Makes Waste." My path is strewn with the hummocks of overtime, fatigue, mistakes, misunderstandings, and disappointments. I force Accuracy and Quality to stand aside and give way to Speed. I cause serious injury or death. Ruthlessly I rush on. The goal must be reached. I am the Rush Job.

"Safe Blasts," Michigan Mutual Shopman, Industrial Accident Prevention Associations.



Percentage Changes in Accident Rates, Rubber Industry

[1] From National Safety Council, 20 N. Wacker Dr., Chicago, Ill.

in both injury rates belongs to plants producing mechanical rubber goods, as shown below:

Industrial Group	1934-1935 Reduction Frequency	1934-1935 Reduction Severity
Entire industry	8%	35%
Mechanical rubber goods	15%	66%
Rubber footwear	13%	63%
Tire manufacturing	6%	16%

During the last two years companies having fatalities or permanent partial disabilities have been requested to make a special report on the circumstances involved in such injuries so that better information could be developed on the fundamental causes of serious accidents in the industry. Summary reports for the last two years have listed 107 serious injuries, and 14 of these cases have been reported in detail. An analysis of the circumstances involved in these accidents discloses:

1. Operators of various types of mechanical equipment were involved in four serious accidents, and of the numerous other occupations, repairmen, laborers, and press men were involved in two each.

2. Machinery was the principal agency of injury, figuring in eight cases. Mold breakers, punch presses, apron mills, and tread cutters are some of the machines on which employes were working at the time of injury.

3. Employes were injured principally by getting fingers or hands caught in or between moving parts of machinery. The next important type of accident, "falling, sliding, flying objects," resulted in one fatality and two permanent disabilities.

4. The principal mechanical causes of these accidents were: "defective substances or equipment" and "improper guarding." A carpenter, for example, was instructed to use only sound stock when planing boards; as the result of attempting to put a defective piece of lumber through the planer, he lost both fingers. Lack of a guard on a punch press was an important factor in the loss of two fingers when the operator temporarily forgot to take precautions.

5. Personal causes involved in these serious injuries were about equally divided between "lack of knowledge or skill" and "wrong attitudes" on the part of employes. A mill hand, for example, lost part of the use of a hand because he disregarded instructions to use a wooden paddle for loosening rubber adhering to the rolls. Lack of experience by a new employe was probably the principal reason why he failed to operate a press correctly and lost three fingers.

The following tabulation gives the percentage distribution of cases (nearly all compensable) covered in recent one-year reports from Illinois, New York, Maryland, New Jersey, and Pennsylvania. These reports covered 224,661 injuries in all industries and 883 injuries in rubber goods manufacturing:

Type of Accident	% in All Industries	% in Rubber Industry
All types	100.0	100.0
Handling objects	25.9	31.3
Falls to a different level	8.7	5.1
Falls to the same level	9.5	4.9
Machinery	12.0	30.7
Vehicles	10.9	1.2
Using hand tools	7.6	4.6
Falling objects	8.7	5.8
Stepping on or striking against objects	5.6	5.5
Electricity, explosives, heat	3.6	5.2
Harmful substances	2.1	1.8
Other	5.4	8.9

The National Safety Council has listed the following rubber companies as worthy of mention for outstanding safety achievement during 1935:

Rubber Footwear: United States Rubber Products Inc., Naugatuck, Conn., plant has the lowest 1935 frequency rate, 2.39; Converse Rubber Co., lowest 1935 severity rate, 0.12.

Tire Manufacturing: Goodyear Tire & Rubber Co., New Toronto, Canada, plant has the lowest 1935 frequency rate among large units, 1.71. The England plant has the lowest 1935 severity rate among large units, 0.08. The Gadsden, Ala., plant has the lowest 1935 frequency rate among small units, 1.31; also the lowest severity rate, 0.004.

Mechanical Rubber Goods: United States Rubber Products sundries plant at Providence, R. I., has the lowest 1935 frequency rate among large units, 0.61; Electric Hose & Rubber Co., lowest 1935 severity rate among large units, 0.004.

Continued Mechanization

(*Continued from page* 42)

brings more profit to the manufacturer and more conveniences and luxuries to the consumer.

As newer industries appear and new inventions are introduced, added demands are made for new employes in hitherto non-existent fields. This picks up any slack due to other industries and out-of-date products causing layoffs.

The more encouragement is given business leaders to develop new business without excessive interference from public officials and from trouble-making agitators, the more they will go ahead and meet a public demand for a new and better product and put more and more of the unemployed back to work.

Not the worry about over-mechanization, but the confidence in future business and freedom to develop it will best take care of unemployment. There is no reason to stop the continued mechanization of industry.

Synthetic Rubber

(*Continued from page* 47)

molding or otherwise causing the composition to assume the shape of the desired product before the chemical action has advanced, molding the composition under pressure, and heating it under pressure from 200° to 300° F.

25. Bell, 626,479, June 6, 1899. An elastic compound comprises vegetable oil, 59 parts; flour of sulphur, 15 parts; liquid tar, one part; petroleum residue, 20 parts; and powdered talc, five parts.

26. Repin, 632,022, Aug. 29, 1899. To produce artificial rubber heat wood oil, whereby it is coagulated, pulverize the coagulated oil in the form of a powder, and incorporate with rubber.

27. Lugo, 639,926, Dec. 26, 1899. A rubber substitute consists of sulphurized oil practically free from glycerin compounds.

28. Lugo, 639,927, Dec. 26, 1899. To produce a rubber substitute mix a vegetable oil and sulphur, heat and agitate the mixture until a solid mass is produced, and then heat the mass in a closed vessel in the presence of water.

29. Bell, 640,735, Jan. 9, 1900. An elastic white compound consists of vegetable oil, chloride of sulphur, mineral matter, and bisulphide of carbon, in suitable proportions united by heat.

30. Prampolini, 645,331, Mar. 13, 1900. A new composition for use as a substitute for rubber consists of the gummy matter of the shrub *Synantheroeas-Mexicanas*, the gummy matter being combined with the residual oil of a volatile hydrocarbon solvent.

(*To be continued*)

Rubber around the Globe

E. G. Holt

WHEN, where, and how rubber was first discovered must be a matter of theory, but it is a fact that the first rubber pioneer—that unknown American aborigine who first noticed its peculiar characteristics—may have been a Pueblo dweller in North America rather than a native of the Amazonian jungles as the orthodox view has it. A rubber ball game leads us to this conclusion.

Columbus is said to have observed such a game played by Haitian natives and to have taken some of the balls to Ferdinand and Isabella on returning from his second voyage. Cortez witnessed the game, known as tlachtli, played by Aztec nobles in the palace of Montezuma in the valley of Anahuac. The Mexican and Mayan legends agree that a famous game of ball was played between the white god Quetzalcoatl and his evil antithesis Tezcatlipoca (using the Aztec names), and if the Aztecs took the game over from the Mayans, it must have been of very early origin. The ball itself, of rubber, must be still more ancient. The migration tradition of all Mexican and Central American Indians, according to authorities, is that they came from "the north," and they may have brought the discovery with them. The ball seems to have been the earliest important form in which they used "ule," the Mexican word for rubber.

Probable Discovery in North America

How long it would take for an intricate sport to develop as the pastime of the nobility is a matter of conjecture. The game of tlachtli was one requiring skill and finesse; players were not permitted to touch the ball with their hands, but directed it against the wall with blows from the elbow, knee, shoulder, or hip; it was played in specially constructed stone courts. The period required for this stage of development must have been one of many centuries.

Hrdlicka states that natives in arid Northern Mexico customarily chew the twigs and leaves of common plants and shrubs, and there is nothing far-fetched in the idea that some ancient Pueblo dweller, chewing the twigs of guayule in which rubber occurs not in fluid form, but in separate tiny particles, noticed a residue of material not reduced by mastication, perhaps strung together several pellets of it into a magical necklace that after stretching would return to its original shape, and finally making a solid lump of the material and accidentally dropping it, observed its peculiar bouncing properties, thus producing the first ball. The making of a rubber ball in this manner by a native shepherd boy in Mexico was related to me by a returned traveler a few years ago.

Thus it is quite logical to believe that rubber was first produced from the guayule shrub which has been domesticated and used to produce rubber commercially in California, that the discovery possibly occurred before the Christian era, that the first actual use of rubber was as chewing gum, and that the discovery took place in North America. The chance of a native in the comparatively uncivilized and thinly populated Amazon jungles having first discovered rubber is far less than the possibilities in more thickly settled Mexico with its advanced civilization. The Mayans could have developed the ball game, and probably noted the similarity in the product of the guayule shrub and the congealed latex of the Castilla trees of southern Mexico and Central America, and it is also possible that rubber was first discovered from the Castilla tree; the Spanish historians mentioned trees as the source of the material used for the balls at time of their conquest. This tree and its cousins grow in the same forests with the Hevea tree in northern South America, and the discovery of rubber in the Hevea could have grown out of the infiltration of ideas from the north.

La Condamine Finds the Hevea Tree

South America, however, was the original home of the Hevea Brasiliensis tree which today supplies 99% of the world's rubber. The French explorer, La Condamine, was the first to contribute really significant knowledge concerning the tree and methods of preparing the rubber, just as his was the first European scientific expedition to descend the Amazon. In 1736 he landed in Peru (now Ecuador) and later crossed the Andes and began his journey down the tributaries to the Amazon. His anecdote regarding the singular use by Omagua Indians of the first rubber bottle-syringes ever viewed by European eyes will not bear repetition here, but from that use of rubber the Hevea tree came to be known in Brazil as the "seringa," and rubber tappers there to this day are called "Seringueiros." It was while first in Ecuador that La Condamine gathered his original notes on the Hevea tree. Samples of rubber from the mouth of the Amazon early found their way to Portugal, and in 1759 a rubber suit was sent to the King of Portugal by the Government of Para. It is to be remarked that the Amazon Indians used rubber in making crude bottles and footwear at the time of European discovery, and La Condamine mentions hollow balls as well as syringes. Pieces of rubber found their way to Europe from time to time for the puzzlement of savants and chemists; in this period the material, as a curio, is said to have sold in England for a guinea an ounce, its extreme high price!

Illustrious names in botany, chemistry, and physics are associated with this unique material. Joseph Priestly, who discovered oxygen, observing that pencil marks could be rubbed out by use of the elastic gum, contributed the English name "india rubber" in 1770 as La Condamine gave it its French name "caoutchouc," from the Indian word for the "tree which weeps" when its bark is injured. The shorter name "rubber" is an Americanism, officially adopted by the English after the buying influence of the United States as the chief consumer made itself felt in the early days of the World War. At the time of our Revolutionary War the only use of rubber in Europe was in the form of erasers, then on sale at about 75¢ each to Londoners and Parisians. The substance probably was never seen by George Washing-

ton, but Franklin may have known of it. Faraday subjected to careful analysis both dry rubber and liquid latex, or rubber milk, as it comes from the tree.

The Pioneer Manufacturer—Hancock

Possible use of rubber in medical and laboratory work was made the subject of increasing study until about 1820, but there was no regular commerce. Then Thomas Hancock, the pioneer rubber manufacturer, began to make use of it in commercial quantities. An Englishman with much mechanical ingenuity and experience, and a studious habit of mind, his observations, mechanical inventions, and adaptations of the material to numerous uses in the period from 1820 to 1842 established the real basis of the modern manufacturing industry. His personal narrative written in 1856 shows a surprising range of products developed before he turned over the business to his nephew, under whose name (James Lyne Hancock) the company still operates. Hancock early became associated with Charles Macintosh, the pioneer maker of rubber raincoats, and for many years supplied the latter with proofed fabrics, some of his more important contributions relating to methods of applying rubber to textile products. The first rubber factory in France was started with Hancock's help in 1828, and he was one of the most successful rubber manufacturers prior to the discovery of vulcanization. The story of his contribution to the industry is one of reward for careful painstaking work, rather than a tale of romantic interest. Incidentally, he mentions Central America as a source of his rubber as early as 1824, but Brazil soon became the chief source of supply.

The early rubber exports from Brazil were not in uniform sheets or balls, and their form was not suited for use in manufacture. The Indians, accustomed to make bottles over earthen molds and to make shoes by drying latex on their naked feet at times, naturally enough produced rubber in these forms at first when commercial demand developed. One of Hancock's greatest contributions to rubber manufacture was his "pickle," a machine in which separate pieces of rubber were by mechanical friction heated to a plastic state and fused into a compact homogeneous mass. This discovery of the importance of heat in connection with rubber not only enabled him to prevent waste of material, but to mold it into whatever form he desired, which had previously been impossible. The modern mixing rolls use the same principles in aiding our manufacturers to secure plasticity and uniformity of material.

Americans Stimulate Commercial Development

Some of the rubber shoes from the Amazon found their way to Boston in Yankee trading ships in 1820, and before long enterprising Yankees were sending wooden lasts to Para for use in making rubber shoes that would fit over leather footwear. An important import trade was soon developed in rubber shoes, bottles, and tobacco pouches, and this trade continued until about 1850. As a result, attention was soon given to methods of manufacturing rubber goods in Massachusetts, and in 1832 the first American rubber factory, the Roxbury India Rubber Co., was organized by Edwin M. Chaffee and John Haskins, patent leather manufacturers. The company engaged in production of garments, shoes, cloth, and life preservers coated with rubber dissolved in spirits of turpentine with lampblack in the solution. In the following half-dozen years there occurred the first of those booms to which the rubber industry has at various times been subject.

The managers of the Roxbury company took advantage of a visit to Boston by President Jackson in 1834 and induced him to visit their plant, presenting him with a suit of rubber clothes, which, the day being rainy, he wore while riding horseback through the streets of Boston. The incident contributed to the growing public interest in rubber, and numerous companies were organized in New England and New York, and millions of dollars invested in these enterprises of the Thirties. But the methods of manufacture were unsatisfactory as we may judge from the following edited account by William H. Richardson, writing in 1858:

"No sooner had the possibility of manufacturing boots and shoes from rubber been demonstrated than the attention of capitalists and inventors was drawn to this new field of enterprise. The anxious speculator and enthusiastic manufacturer plunged boldly into the sea of trade. All classes became interested; stock companies were formed the shares of which were eagerly snatched up and visions of untold profits divided 'in anticipation.' But the bubble soon burst, goods manufactured in April became a sticky mass of useless rubbish in July. The warm weather literally melted hopes and expectations. A panic was the consequence, mills were abandoned, thousands of artisans thrown out of employment, tons of rubber, raw and prepared, were either given away or sold at ruinous prices. Hilltops blazed with its ignited masses, and the illuminations of the 4th of July succeeding the failure were made unusually brilliant by the aid of the (first) India Rubber Panic," which occurred about 1838.

The attention of Charles Goodyear became concentrated on rubber, to which he had previously given some attention, during this time. While in New York he called on a warehouse of the Roxbury company and was told that a fortune awaited the man who could discover a way of preparing rubber so that it would not melt with heat or grow stiff with cold.

The Founder of the Industry—Goodyear

Goodyear was a well-educated young man of excellent New Haven family, with a seeming lack of ordinary care (rather than a lack of ethics) in money matters, a religious temperament, and what we call today a "one-track mind." He also possessed a family, but thoughts of them did more to stimulate than to interfere with his experiments. He became obsessed with the idea that he could make the necessary discovery, and that rubber had tremendous possibilities in manufacturing, and devoted his entire life thenceforth, all his time and energy, and all the financial backing he could enlist, to the object of solving the mysteries of the proper compounding and manufacture of rubber. The difficulty of his task cannot be overstated. In his own words:

"I was encouraged in my efforts by the reflection that what is hidden and unknown, and cannot be discovered by scientific research will most likely be discovered by accident if at all, and by the man who applies himself most perseveringly to the subject and is most observing of everything relating thereto."

After a heartbreaking series of misadventures (many of his experiments were carried on while he was in jail for debt) he did actually, by noticing the effect on a mixture of rubber and sulphur of heat to which it had accidentally been subjected, discover in 1839 that a proper mixture of sulphur with rubber and white lead, subjected to heat in the open air, would yield a product with characteristics widely different from and superior to ordinary raw rubber, and that phenomenon known as

"vulcanization" (the name was contributed by William Brockedon, an associate of Hancock's, after Vulcan, the Roman fire-god) is the keystone on which the ever-widening arch of the industry has been erected. Goodyear did not apply for patents until late in 1841 (granted in 1844), delaying so as to have them include the results of later discoveries from subsequent experiments.

The story of his troubles with those who contested his patents, his defense by Daniel Webster in the latter's last case in 1852 before the United States District Court at Trenton, and his final vindication may be read elsewhere and is worth reading. Anyone acquainted with Goodyear's life, its recurring intervals of dire poverty, the elusive difficulties of the task he undertook, his fanatical faith in its final achievement, will readily acknowledge the indebtedness to him of all subsequent generations. Only through his genius and perseverance did the employment of rubber, both soft and hard rubber, in its modern multifarious applications become possible. His health was ruined by his privations, and he did not live long to enjoy the fruits of his work, which, owing to the bad record from the rubber boom and panic and his own financial difficulties, were not realized rapidly. The last two years of his life (he died in 1860) were spent in Washington, D. C.

After the discovery of vulcanization the demand for rubber increased more rapidly, but still gradually for many years. The exports of rubber shoes from Brazil at the rate of over 400,000 pairs annually continued until 1845, after which the decline was rapid, and thereafter Brazilian exports were in the form mostly of large balls. The search for supplies was being extended to new areas also; about 1842 England began to import vine rubber (Urceola elastica) from Singapore. This source had been reported as early as 1798 by James Howison, an Englishman, through whom we learn that the Chinese knew rubber before any reached them from America. Probably the price of rubber from 1830 to 1845 averaged 25¢ a pound or less; as demand increased, prices increased, and the production of the material from additional sources was gradually extended.

Fears of Rubber Shortage in Seventies

According to British official "real values," the Brazilian rubber was valued upon importation at about 35¢ a pound from 1856 to 1860 and continued near that level during our Civil War when demand slackened in the United States, but averaged nearly 47¢ in the five following years when demand in America and Europe increased greatly. At this time England and the United States were the chief consuming nations, and England was already taking the position since occupied as the center of distribution for the commodity throughout Europe. From 1868 to 1872 imports into the United States from Brazil showed no further increase, and British imports from Brazil were lower in 1870 than in 1868.

Although, owing originally perhaps to Portuguese or British initiative, Landolphia vine rubber from the Islands of Fernando Po and St. Thome off the African West Coast began to appear on the British market in 1861, and that source was gradually becoming more important, the rubber was not of equal quality with Brazilian rubber. The caucho rubber of Colombia (then including Panama) was exploited to such an extent that during the late Sixties Colombia ranked second only to Brazil as a source of supply, but the trees were destroyed by the methods of rubber collection, and Colombia passed its peak by 1872. In the period from 1868 to 1870, the yield of vine and Assam rubber from India and the East Indies was higher than for any subsequent period. The American development of rubber reclaiming from worn-out products was begun in 1871 or 1872. Insignificant at the time, but the first step toward the development of Akron as the leading rubber manufacturing center in the world, was the start there of the first rubber factory west of the Alleghenies by Dr. B. F. Goodrich in 1870.

Fears of a rubber shortage were being voiced, and the stage was set for attempts along the line of Hancock's suggestion of 1855 or earlier, that there was probability of success in an enterprise undertaking the cultivation of the best kinds of rubber-bearing plants in the East and West Indies.

(To be concluded)

International Committee's Policy

(Continued from page 44)

supposing that the Committee would frown on a moderate advance in prices from the present level.

"If the Committee now believes that a price of around 8d. a pound is adequate—and there is good reason for thinking that the Committee has adopted this view—then producers and shareholders may be tolerably sure that any marked tendency for prices to rise appreciably over 8d. will be quickly countered by an increase in export quotas.

"If this view is correct, it is not improbable that the Committee, in the course of time, will come in for a certain amount of criticism for attempting to keep the commodity at what will be termed the unsatisfactory price of 8d. per pound. The Committee is not likely to pay much attention to criticism of this character. The Committee's task consists not merely in maintaining prices at the level which it considers to be reasonable, but also in so framing its entire policy as to safeguard the interests of the industry in the more or less distant future. The need for increased consumption, for instance, is obvious, and the Committee, it may be safely assumed, believes that by maintaining moderate and stable prices it can contribute in considerable measure to the desired expansion in demand.

"The very steep rise which took place in world consumption of rubber during the years in which the world was slowly recovering from the depression indicated that the low prices which had been ruling for the commodity had greatly extended the basis of consumption by encouraging the use of rubber in fields where formerly it had been unknown. If the Committee were now to yield to the demands which are being made for higher prices, it could hardly fail to weaken this foundation in some degree. Certainly that is a danger, which, however remote it may seem, should be avoided.

"It is quite certain that the Committee will persist in its present policy of endeavoring to achieve a moderate and stable price in the confident belief that this policy will, in the long run, work greatly to the industry's advantage.

"There is little doubt that if the Committee so desired it could quickly establish much higher prices than those currently ruling. But the Committee has given no evidence of any such desire, and producers and shareholders must resign themselves to a maximum price of not much more than 8d. a pound for some time to come. Actually that price should yield fairly satisfactory profits, even on the present restriction basis, and this basis should be appreciably more favorable a year hence." (Forwarded by Assistant Trade Commissioner W. S. Lockwood.)

Editorials

Be Sure There's Work to Do

WORKERS in the rubber or any other industry should provide themselves with a workable means of collectively bargaining with their employers. The particular type of collective bargaining vehicle they adopt, however, should be determined only after a careful study of the ultimate advantages and disadvantages to themselves of the various kinds available.

Certainly their best ultimate interests do not reside in that type which incites a flaming hatred against the employer and their fellow workers with whom they must spend most of their time, or one that definitely threatens the continued existence of the business that affords them a living. Similarly the workers' best ultimate interests are not served by that type of employes' representation plan which prevents free expression and action of the worker or that fails to reveal for the employes' understanding and consideration the company's business managerial problems. Between the two extremes are types existing, or that can be made to exist, which afford a fair, untempered, and non-coerced method of treating all problems common to the interests of both factions. It matters little whether the organization is an industrial union or a so-called company union so long as its policies focus upon employe and employer mutuality of interest.

Such a desirable state of affairs has never occurred in the history of collective bargaining where outside interests seeking either financial benefits or political prestige or both became the motivating influences.

The nefarious sitdown strikes that continue in Akron, apparently with little reason beyond a malicious grievance of inflamed hatred, and certainly with no evidence of a controlling influence of an orderly, understanding nature, can but reflect present and ultimate disadvantage to both the employe body and to management. Little doubt can exist in the mind of the sideline observer that these feuds merely pit employe and employer against one another as pawns in a game designed to benefit outside interests who have far less philanthropic intentions than their statements are designed to imply.

The debacle of the India Tire & Rubber Co. is a historic example of the ultimate advantage to workers as well as to investors of the sincerity of their militant self-styled benefactors from the outside. It is not at all unlikely that other similar circumstances are now in the making in Akron and elsewhere in the rubber industry. The serious phase of such a situation does not become apparent to the mentally agitated worker until he finds that his means of livelihood has become non-existent. And not until then does he realize also that the pseudo-philanthropists, whose advice had brought this condition, have vanished, and cannot be found even for the much needed expressions of sympathy in his hours of forced idleness when his mind is tormented with the reflection that he had been misled into biting the hand that had always fed him.

Service and Progress

INDIA RUBBER WORLD has completed 47 years of pleasant relations with those persons whose interests and activities, like its own, have been directed to the various phases of the rubber industry. Together they have seen the rubber business grow in size from one of small proportions with limited applications to the essential and enormous industry that it is today; and in fundamental knowledge from a state of bewildering and discouraging paradoxes to another holding such an accumulated wealth of underlying scientific facts that now vast new fields open to future rubber application potentialities, thus assuring continued growth and importance. The phenomenal progress has been due in no small part to the acquired habit of opinion and experience exchange not only among the members of the rubber industry itself, but also with those of other industries.

In October, 1889, INDIA RUBBER WORLD was founded by the late Henry C. Pearson to serve as a medium through which these exchanges of opinion could be distributed among interested persons everywhere. With this pioneering enterprise rubber workers, otherwise largely confined to the horizons of their individual knowledge, were afforded a means of periodically knowing the current advancements of the industry in this country and abroad. It revealed the important news of the industry and served somewhat as a textbook on rubber product manufacturing practices and on crude rubber production procedure. Through the cooperation and support of all persons allied with the industry INDIA RUBBER WORLD soon established itself as a beneficial fixture, a source of progressive facts and suggestion provoking discussions. Thus it has through the years to date contributed much to prepare the way for and to stimulate progress. With this issue begins another, the forty-eighth year, of INDIA RUBBER WORLD service. With it comes a renewed confidence that the industry now faces opportunities of proportions that can well stagger the imagination, and a confidence, too, that within the industry lies a restless force of intelligence and ambition that will master these opportunities in a manner that will make our rubber industry of the future seem as that of another planet when a few years hence it is compared with our industry of today.

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Meetings

THE Fall Meeting of the Rubber Division, A. C. S., was held at the Roosevelt Hotel, Pittsburgh, Pa., September 10 and 11 as a part of the general program of the ninety-second meeting of the American Chemical Society, which convened throughout the week with headquarters for all other divisions at the William Penn Hotel.

Approximately 350 rubber technologists attended the Thursday afternoon and Friday morning sessions of the meeting, which were held promptly to schedule by the Rubber Division chairman, N. A. Shepard, of the American Cyanamid & Chemical Corp. The Papers Committee, Ira Williams, chairman, provided the program of both sessions with a most interesting and instructive group of 15 papers, abstracted below, of which five constituted a symposium on latex.

Much interest was also manifested by the rubber technologists in the paper "The Constitution of Polysulphide Rubbers," given by S. Maner Martin, Thiokol Corp., at the Thursday morning session of the Colloidal Division at the William Penn Hotel. The abstract of this paper follows those of the Rubber Division appearing below.

The Friday session was concluded with a business meeting in which officers for next fiscal year were selected as follows: chairman, H. L. Trumbull, B. F. Goodrich Co.; vice chairman, A. R. Kemp, Bell Telephone Laboratories; secretary-treasurer, C. W. Christensen, Monsanto Chemical Co., R. S. L. Division; and sergeant at arms, L. V. Cooper, Firestone Tire & Rubber Co. The new executive committee consists of Mr. Shepard; R. H. Gerke, United States Rubber Co.; E. B. Babcock, Firestone; J. T. Blake, Simplex Wire & Cable Co.; and W. F. Busse, Goodrich.

Mr. Gerke read a brief report of progress of the Crude Rubber Committee, and C. W. Christensen gave the secretary-treasurer's report showing a total Rubber Division membership of 485 and a treasury balance of $7,283.98 as of September 10, 1936. Other transactions consisted of a decision to place the responsibility of handling technical papers with the vice chairman instead of with a Papers Committee as was planned last year; approving the appointment of a committee to consider what action the Rubber Division should take regarding the invitation of the Institution of the Rubber Industry to take part in an International Conference on Rubber to be held in England in 1938; and consideration of a plan to hold a Goodyear Memorial Meeting in Connecticut in 1939 to commemorate the one hundredth anniversary of the discovery of vulcanization.

As usual, the banquet of the division, held in the ballroom of the Roosevelt Hotel, Thursday evening, was the lighter-moment highlight. The excellent dinner and delightful variety entertainment gave material evidence of the commendable work of the Committee on Arrangements consisting of the following persons: A. B. Kemple, Rex-Hide, Inc., chairman; A. Brill, Republic Rubber Co.; Robert Schar, Rex-Hide; and P. Aultman, Pennsylvania Rubber Co.

An abundance of useful and acceptable souvenirs were contributed by Binney & Smith Co., Godfrey L. Cabot, Inc., Columbia Alkali Corp., General Atlas Carbon Co., Herron & Meyer, Inc., J. M. Huber, Inc., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., R. S. L. Division, Naugatuck Chemical, New Jersey Zinc Co., Rex-Hide, Inc., United Carbon Co., and R. T. Vanderbilt Co.

Abstracts

Examination of Latex and Latex Compounds. Part I. Physical Testing Methods. The more important general physical tests such as pH, surface tension, viscosity, and mechanical stability are discussed as to their importance and methods of determination. The pH of latex is one of its most important properties inasmuch as it is related in a fundamental way to the stability of the latex as a colloid. The glass electrode method properly used is believed the most reliable and accurate means for measuring the pH of latex. Surface tension is presumably important as an indication of the foaming and related properties. The ring method is simple and accurate if its results are calculated properly, using the method reported. Viscosity or flow property of latex and latex compounds is important in their handling and processes of dipping and handling. The theory of viscosity is briefly outlined. The capillary flow and the rotating cylinder methods are discussed mathematically. Mechanical stability of latex determines its resistance to the violent shearing stresses occasioned by mechanical treatments. The customary procedure of measuring mechanical stability is modified by the application of a correction for speed of the motor, and the method of selecting the end point. H. F. Jordan, P. D. Brass, and C. P. Roe.

Examination of Latex and Latex Compounds. Part II. Chemical Testing Methods. Procedures are detailed for the following determinations: total solids and rubber content; dry rubber content; ammonia; fixed alkali; water solubles; acetone extract; total sulphur; combined sulphur; copper; manganese; starch; sediment and sludge; and coagulum. D. E. Fowler.

Production and Properties of Vulcanized Latex. The vulcanization of latex, while still in its natural dispersion, may be accomplished in various ways: namely, under elevated pressure and high temperature; under atmospheric pressure and moderately elevated temperature; under atmospheric pressure and room temperature. Data given show the tensile properties of vulcanized latex produced by cures at moderately elevated temperatures making use of (1) sulphur, zinc oxide, and accelerator; (2) sulphur and zinc bearing accelerator; (3) zinc oxide and sulphur liberating accelerator. The quality of these stocks is compared with a few references found in the literature, and it is noted that the rate of cure of vulcanized latex exceeds that of pale crepe and is more rapid in the liquid dispersion than in a dried latex residue. By the use of vulcanized latex "overcure" may be avoided, and excellent aging with high tensile results. In short, vulcanization of latex in its uncoagulated dispersion puts to maximum use the natural non-rubber constituents, speeds the cure, and maintains the life of the rubber. H. B. Townsend.

Physical Testing Procedure for Latex Stocks. Adjustment of stabilizers may be necessary to produce a smooth surface on an air dried latex test slab. A combination of 1% of casein and 1% of Aquarex D on the rubber gives a satisfactorily dry slab. Reproducible results cannot be obtained unless the test strips are conditioned at controlled relative humidity. Zero per cent humidity gives highest tensile and modulus figures. Batch to batch accuracy of latex stocks using

methods described are comparable to that of mill mixed pure gum stock. L. A. Wohler.

Preparation and Properties of Latex Battery Separators. The preparation of storage battery separators from latex is described. The electrical resistance of latex separators is shown to be lower than that of wood separators, especially at temperatures in the neighborhood of 0° F. (=17.7° C.), and the terminal voltage under a load of 300 amperes, of batteries containing latex separators, is shown to be higher than those containing wood separators. The latex separators were found to be more durable than wood separators, judging by the results of the life test. H. W. Greenup and L. E. Olcott.

The Transparency of Rubber Compounds Containing Magnesium Carbonate. When certain grades of magnesium carbonate, notably Japanese brands, are used as fillers in rubber compounds, a light transparent product is obtainable. Investigations of such compounds have resulted in the production of a yellowish transparent grade of rubber which may contain as much as 40% or even more of Japanese magnesium carbonate. High tensile strength, good aging properties, and excellent wear resistance are said also to be characteristic for such compounds, which are the basis for the transparent crepe soles found in most Japanese tennis shoes and the like footwear. Basic magnesium carbonates of the type $5MgO.4CO_2.Aq.$ will produce transparent rubber. The Japanese carbonate, corresponding to the formula $5MgO.4CO_2 6H_2O$, gave higher total light transmissions at low filler concentrations than the best domestic carbonate, corresponding to the formula $5MgO.4CO_2.9H_2O$. W. F. Bixby and E. A. Hauser.

Deproteinized Rubber. The special virtue of deproteinized rubber is its low water absorption and the electrical stability it imparts thereby to rubber compounds immersed in water. Electrical engineers are specifying such compounds for submarine, underground, and duct cables and all other insulalation that may be exposed to water. Eventually practically all rubber insulation will be of this type since it is gradually being realized that nearly all rubber cables for some portion of their length are continuously or intermittently exposed to water. Deproteinized rubber forms compounds that seem normal in all respects. The rate of vulcanization, the initial physical properties, and the resistance to aging are essentially the same as those obtained with the ordinary commercial grades of rubber. The salient feature of deproteinized rubber compounds is their low water absorption under all conditions. They are correspondingly exceedingly stable electrically during exposure to water. C. R. Boggs and J. T. Blake.

Determination of Sulphur in Rubber. The determination of sulphur in rubber by precipitation of the oxidized sulphur as sulphate by means of barium chloride and back titration of the excess barium using tetrahydroxyquinone as indicator is sufficiently accurate for routine control of sulphur with a maximum variation of 0.03% of sulphur from gravimetric analysis. The method is rapid, and after oxidation to the sulphate form in solution a determination can be made on a single sample in 25 or 30 minutes. In groups of analyses this time can be reduced to 15 to 20 minutes. Robert T. Sheen, H. Lewis Kahler, and Delbert C. Cline.

Determination of Diarylamines in Rubber Compositions. The detection and estimation of age resisters in rubber is reviewed. Procedures are given for the semi-quantitative determination of diphenylamine, phenyl-beta-naphthylamine, and N, N'-diphenyl-p-phenylenediamine in rubber. David Craig.

Natural and Synthetic Rubber. XVIII. Sol Rubber and Gel Rubber. The authors' summary states: "Sol rubber prepared by diffusion in ether can be separated into two components, the less soluble of which contains a large amount of oxygen and is probably gel rubber. Viscosity measurements and hence molecular weight determinations with samples thus prepared are consequently too high." Thomas Midgley, Jr., and Albert L. Henne.

Structure of Rubber Sols as Indicated by Swelling and Viscosity Measurements. The fractional increase in viscosity caused by dissolving rubber in different solvents bears no relation to the viscosity of the solvents, but is proportional to the swelling of rubber in the solvents. The solvent may be removed from a rubber sol and replaced by a different solvent which will produce a viscosity characteristic of the second solvent. This indicates an equilibrium between each solvent and the rubber. Increase in viscosity is probably caused by swelling of the micelle and immobilization of solvent rather than by the presence of rigid filiform molecules. I. Williams.

Studies in the Vulcanization of Rubber. VII. Unsaturation of Rubber Vulcanized with Dinitrobenzene. A method has been developed to determine the unsaturation of rubber involving the use of iodine bromide. Study of the change in unsaturation of rubber during its vulcanization with m-dinitrobenzene indicates a definite decrease occurs. This decrease is a linear function of the combined nitrogen which is in accord with the chemical theory of vulcanization. The virtue of this method of analysis apparently lies in the fact that the chemical combination of dinitrobenzene and rubber is so weak that ordinary methods displace the combined nitrogen and fail to disclose the real change in unsaturation. The conclusions of Fisher and Gray based on such a method would seem to require modification. Calculations based on the above data imply that one molecule of nitro compound saturates about six double bonds. John T. Blake.

Vulcanization Characteristics of Certain Mercaptobenzothiazole Derivatives. The results of standardized vulcanization tests on 45 condensation derivatives of mercaptobenzothiazole are reported. The materials alone and with added diphenylguanidine were compounded in a gum stock and examined for curing value and scorching tendency. These characteristics are modified variously by the radicals present in the substituent group attached to thiol sulphur. M. W. Harman.

An Air Bomb Aging Test for Tread Compounds. Data are presented which show the effect of air pressure, temperature, elongation, oxygen concentration, time, and pigment variation on the aging of rubber compounds. Modifying the standard air bomb aging conditions to zero elongation, 50 pounds per square inch (3.5 kg. sq. cm.) pressure and 220° F. (104.4° C.) temperature for 10 hours, has provided a shorter laboratory test which parallels the Geer oven aging test in its effects on carbon black compounds as well as other types or compounded stocks. The use of this test is suggested for comparing the aging characteristics of compounded rubber stock, particularly tread stock. E. W. Booth and D. J. Beaver.

Effect of Cure and Temperature of Flexing on the Flex Resistance of a Conventional Tread Stock. The author concludes as follows: In general the flex cracking of vulcanized rubber proceeds more rapidly when flexed cold than when flexed hot. Overcuring within the limits reported reduces the amount of cracking. Stocks showing poorest flex cracking resistance at normal temperature are the most affected by variations in testing temperatures. When flexed at elevated temperatures, the flex cracks are fewer but larger than when tested at lower temperatures. The effect of foreign material and surface irregularities is magnified by raising the temperature of testing. The difference in the resistance of stocks to flex cracking is much more pronounced when tested at room temperature than at elevated temperatures. Normal temperature testing is, therefore, the more desirable for purposes of evaluation. M. F. Torrence.

The Constitution of Polysulphide Rubbers. Synthetic rubber is related to synthetic resins and plastics in the chemistry of these products rather than in a comparison of their physical properties. The general properties noted of polysulphide rubbers' chemical reactions are such that several have attained a place of importance as valuable raw materials. They are used in the fabrication of articles requiring flexibility and elasticity at temperatures as low as 40° C. (40° F.) below zero, coupled with solvent resistance, good aging characteristics, or both. The chemical constitution of ethylene polysulphide rubber is discussed. The origi-

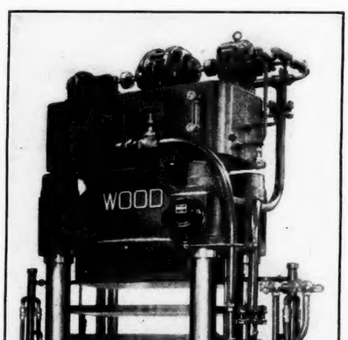
(Continued on page 80)

New Machines and Appliances

Precision HydroLectric Steam Platen Press

MODERN hydraulic steam platen and molding presses operated by individual pumping units have the advantage of permitting a pressure regulation to suit the work on hand and at the same time of holding this pressure during the entire curing period. However to operate the pressure control on the rotary piston type of pump usually applied to such presses requires time and considerable effort. Another disadvantage of this type of equipment usually offered is that during the pressure holding or curing period, especially if of longer duration, the pump and oil pressure fluid will heat up to such an extent that artificial cooling of the oil is necessary.

These drawbacks are overcome by a device which has proved very successful in actual press operation and is incorporated on the hydraulic press illustrated. The pumping system consists of a rotary low-pressure gear pump and a rotary piston high-pressure pump, both operated by one double ended electric motor. When starting the press operation by a push-button station, both pumps will discharge their full volume into the press cylinder until the maximum low pressure, at which the automatic low-pressure pump bypass valve has been set, is reached. At this pressure this valve will function, and the low-pressure pump will discharge its full volume under no pressure back into the pump suction tank, while the high-pressure pump will continue raising the press ram and building up to the maximum pressure to which the control described below has been set.



Wood HydroLectric Steam Platen Molding Press

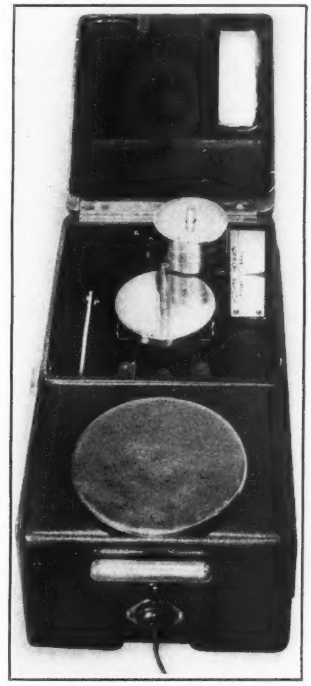
This pressure control and holding device, which also functions as a hydraulic pressure gage, is mounted easily accessible to the operator on front of the press. It carries a dial reading in its upper portion "pressures in pounds per square inch on the steam platen area," and in its lower portion "pressure in pounds per square inch on the press ram." An additional index arm can be moved along the scale by turning a knurled knob located on the outside of the casing.

This arrangement permits almost instantaneous setting to the desired pressure. When the pressure to which this instrument has been adjusted by turning of the knob has been reached, the electric motor and pumps will be automatically shut down. The pressure on the press ram then will be maintained until this pressure should drop 1 or 2%. At this point the instrument automatically will start the motor and high-pressure pump again for only a few revolutions until the pressure loss is made up.

Normally during a curing period of about ten minutes only one intermittent starting of the motor and pump will take place. It is obvious that with this device the pressure can be held on the press for any length of time without needing any attention by the press operator. Also, as the pumps and motor are shut down about 98% of the curing time, no heating of the pressure fluid or pump can take place, and, of course, very little power is consumed. The press illustrated, of 750 tons' capacity, permits instantaneous pressure regulation between 300 and 2,000 pounds per square inch on the steam platen area. This type of press is built in various sizes and capacities. R. D. Wood Co., 400 Chestnut St., Philadelphia, Pa.

Shadowgraph Scale

THE unique scale pictured is an instrument for rapid and accurate commercial weighing of predetermined amounts of commodities. This means that the material being weighed has a definite weight value as per a rubber formulation mix. The illustration of the housing of the weight section is turned back showing the weights, weight platter, and Shadowgraph indicating scale which is viewed through the rectangular opening in the housing when that portion is closed in place.



Shadowgraph Scale

The circular commodity platter is shown in the lower half of the picture, also the electric cord connection for illumination of the Shadowgraph dial.

In operation a predetermined weight is placed on the weight platter, and the commodity on its platter to balance indicated on the dial. The shadow feature eliminates all indicating mechanism and thereby a parallax is completely overcome.

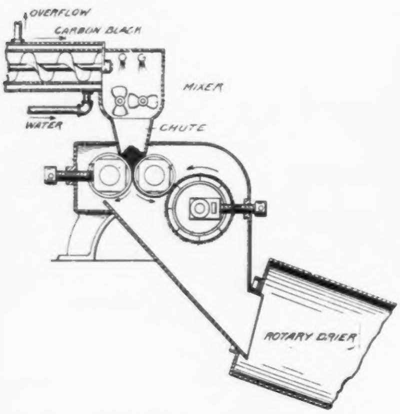
The long travel on the dial for delicate weights permits very accurate weighing to fractional ounces or grams. The scale is well adapted for counting articles by weight as in the case of toy balloons or other light rubber articles to be counted for standard packaging. The scale is thus a dependable and convenient piece of apparatus for both factory and laboratory. The Exact Weight Scale Co.

Agglomerated Carbon Black

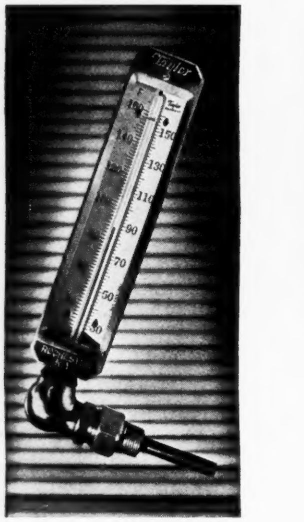
FOR the purpose of overcoming some of the objectionable properties of raw carbon black such as the formation of dust during handling and mixing with rubber the invention[1] here referred to provides a process and apparatus.

In accordance with the invention, the carbon black is moistened with a vola-

[1] U. S. patent No. 2,040,770, May 12, 1936.



Machine for Agglomerating Carbon Black



BINOC Thermometer

tile liquid, e.g. alcohol, benzol, gasoline, methanol, and acetone, but for which purpose water is entirely suitable, the mass is stirred and kneaded, to form a rather stiff paste, friable in character. The paste is then worked upon an ordinary roller mill, for example a mill consisting of two horizontal rollers rotating in a vertical plane; the rollers may be operated at slightly different surface speeds to cause the roll-milled material to adhere to one of the rollers, as a compacted layer. When this has been accomplished, another roller carrying needles or other points of similar character is rotated in such a position that the needles will scratch off the material on the roller, thereby producing shaped masses of the carbon black, which are then subjected to a high temperature drying operation, preferably at a temperature very much above the boiling point of the volatile solvent employed.

The dried material so produced can then be passed over a series of sieves to separate the same into different sizes, as required for different particular purposes for which the carbon black is to be employed.

New Thermometer Tubing

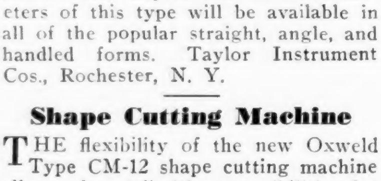
MERCURY-IN-GLASS industrial thermometers always have been notoriously difficult to read except at very close range and under most favorable lighting conditions. That characteristic not only discourages frequent readings, but is responsible for many erroneous readings as well. This difficulty is corrected in a fundamental manner by a uniquely designed thermometer tube which is extremely easy to read.

This new thermometer tubing, known as BINOC, is an outstanding achievement of modern optical science. Advantages of the design include: more than twice the accustomed angle of vision combined with high magnification of the mercury column; binocular vision (i.e., readability with both eyes) at normal or greater than normal distances, whereas it previously was necessary to stoop and squint; triple-lens construction gathers three times as much light and concentrates it behind the mercury column, making the column stand out in sharp relief; confusing empty-bore reflections are eliminated by the scientifically determined lens angle and extended opaque background.

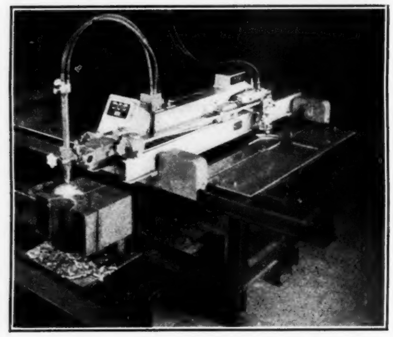
The legibility of these new industrial thermometers is further improved by bold, black numerals and graduations on the cream-tinted, non-tarnishing scale. The Taylor line of thermometers of this type will be available in all of the popular straight, angle, and handled forms. Taylor Instrument Cos., Rochester, N. Y.

Shape Cutting Machine

THE flexibility of the new Oxweld Type CM-12 shape cutting machine allows almost limitless possibilities for its use. It is more powerful and has a greater cutting capacity than any other machine in its class. Any shape, from the simplest to the most complicated, can be accurately produced either automatically with templets or guided by hand. The immediate transfer of motion from one end of the machine to the other is a factor in assuring precision in all cutting operations. In addition to cutting shapes of all description the machine will cut straight lines automatically in any direction and at any bevel. Cuts as long as 144 inches are possible, and an important feature lies in the fact that straight-line cuts can be made at any desired angle in the horizontal plane. A special circle cutting attachment is also provided, thus enabling the automatic production of circles



Low Water Cut-Off, No. 66-DB



Oxweld Type CM-12 Shape Cutter

from two to 24 inches in radius. Still another feature is that of multiple cutting. The apparatus is designed to carry from two to five blowpipes which can perform multiple cutting operations under all the conditions possible with a single blowpipe.

All important controls have been duplicated so that operation is possible from either blowpipe or tracing position. The blowpipes used have been constructed to give greater flame stability and increased economies in cutting. Material up to 12 inches in thickness can be easily handled; for heavier cuts a special blowpipe is available. The sensitive tracing mechanism, accurate scale calibrations, and freedom from friction and vibration, incorporated as a result of careful study and workmanship, make precision cuts a routine accomplishment. Linde Air Products Co.

Liquid Level Control Switch

THE working mechanism of the liquid level control switch pictured simply consists of a mercury switch inside of the float attached to the head by metallic bellows, as shown. As the switch moves through its arc, the mercury makes and breaks contact, the simplest arrangement ever developed. There is nothing to get out of order or cause trouble. The float is drawn from a flat sheet, making the construction entirely seamless with the single exception of the tightly sealed bellows-head stamping. A carefully worked out relation between float and bellows insures precise operation. The float is protected by a specially designed float-shield which prevents turbulence of the boiler water from affecting float action. McDonnell & Miller.

Inner Tube Former [1]

DOUGHNUT inner tubes are formed from a cylindrical rubber blank *B*, the walls of which are vacuum held in contact with the inner surface of a hollow mandrel. The top and bottom ends of the blank are similarly supported against the upper and lower faces of the tube die halves 1 and 2.

[1] U. S. patent No. 2,024,149, Dec. 17, 1935.

(Continued on page 72)

New Goods and Specialties

Garter-Attached Sock

PACER by Holeproof offers something new in men's hose. This regular-length sock, in a wide range of patterns, clocks, and solid colors, as its special feature has a perfect-fitting washable round garter already attached to the front top of the sock. Pacer is said to be thoroughly tested and proved quick, convenient, and clean.

Grip-Rite Hanger

A SIMPLE hanger for holding long-handle household tools such as brooms, mops, etc., is made of rubber in a single-piece molding.

Its form is that of a thick flat ring about 2½ inches outside diameter by 1⅛ inside diameter. Integral with the ring is a lug flush with the face, having an angular back. This lug serves as a nailing support for attaching the article to the wall at a projecting angle. The contrivance holds a broom, for example, by reason of the angular grip exerted by the ring on the vertical broom handle. The device is simple, durable, and effective for the purpose for which it is intended. United Sales & Mfg. Co.

Anti-Skid Device

FROM Grenoble, France, comes a novel anti-skid unitary device for pneumatic tires. It consists of a cast frame or saddle piece with end lugs for attachment and with either single or double rows of teeth for gripping contact with the road. Within and under the saddle framework is fitted a molded rubber pad reenforced with a cotton cord base to give good adhesion on all kinds of ground. As the metal part comes in contact with the ground only when the rubber pad is compressed, this construction prevents premature wear of the metal teeth. The individual pieces are quickly and easily applied to a tire by means of rubber straps or belting. Paul Feltrin.

New Tire Fabric

FROM England comes the report of a new type of fabric having a kind of weft woven into it of such a nature that it yields to rubber treatment more readily than cotton weft. Letters patent have been taken out in connection with the plastic, elastic, or extensible nature of the weft for use in tires. In weaving the fabric a fine spun rubber-like weft is used, and when this fabric is put under pressure, the warp cords press against the weft threads, causing them to extend and conform to the outer surface of the cord instead of lying like a straight bar across the cords. The defects of a cotton thread as weft in tire fabrics are well known in the trade, as considerable difficulty has been experienced in the past because the fabric assumes a basket-like effect, causing friction between the warp cords and the cotton weft thread. This new fabric with elastic weft would appear to have several advantages over weftless cord owing to the improved spacing obtained, and also the saving of the large capital outlay necessary to produce weftless cord as used for tires. Preston Tyre Fabric Mfg. Co., Ltd.

Improved Hot Water Bottle

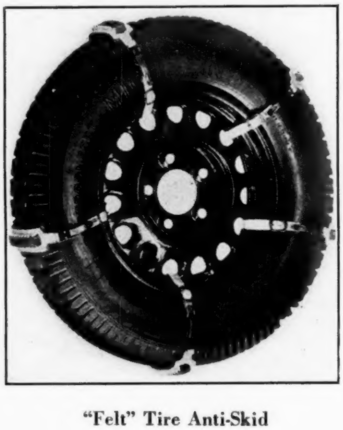
MOLDED hot water bottles and fountain syringe bags are outwardly very similar in design, whatever may be the quality of the rubber material used. An improved bag of the typical appearance is illustrated possessing a patented internal structural feature[1] designed with a central wall or fin to prevent the bag from expanding and contracting or otherwise bowing when filled with water in use. This central internal feature is molded integral with the sidewalls of the bag. It not only retains the bag from bowing, but continually spaces the sidewalls from touching and therefore adhering together when dry. Antonio Richards.

[1] U. S. patents No. 2,003,092, May 28, 1935, and No. 2,041,515, May 19, 1936.

"Protex" Surface Coating

A NEW latex compound known as "Protex" is now being employed by bumper and automotive manufacturers to cover metal parts. In some instances entire automobiles have been coated for export shipment from factory to final delivery. Refrigerators and other articles with polished surfaces have also been coated in the same way, giving protection against marring of their finish by abrasion, corrosion, etc. One large shoe company uses the material to coat white shoes during manufacture; the protective covering is stripped from the shoes when they are completed, thus eliminating entirely the cleaning process formerly necessary.

The outstanding features of "Protex" are its ease of application, flexibility, and resistance to chemical action. At present the most widely used method of applying the material is in combination with paper, the latex forming a binding layer between the surface being covered and the wrapping paper. This protective method is applicable in many fields where articles must be surface perfect for display and sale. American Anode, Inc.



"Felt" Tire Anti-Skid

Richards' Improved Water Bottle

Removing Protex-Paper Coating from Automobile Fender

Editor's Book Table

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BOOK REVIEWS

"Rubber. A Story of Glory and Greed." By Howard and Ralph Wolf. Covici-Friede, New York, N. Y. Cloth, 533 pages, 6 by 9½ inches. Price $4.25.

In this volume the reader will find a racy, readable, yet accurate account of the long story of rubber. Its varied phases are treated in five divisions: namely, (1) Genesis, (2) Wild, (3) Plantation, (4) Laboratory and Mill, and (5) Big Business. The story is well characterized by its subtitle which summarizes the cruelties practiced on the natives of the Amazon and the Congo; the application of scientific study leading to the ampler knowledge of the material and its adaptations to modern life and its commercial and industrial development by the financiers of big business.

The authors merit praise for the thoroughness of their painstaking research into voluminous official records, the results of which are evident throughout the book. The facts recounted under big business are particularly revealing and climax the story. A regrettable omission is an index, lack of which is keenly felt.

"Davison's Textile Blue Book, 71st Year, July, 1936." Davison Publishing Co., 50 Union Square, New York, N. Y. Handy Edition. Cloth, 1,273 pages, 6 maps. Thumb index.

This is the only complete annual register of the textile industry published in 1936. No information has been printed without authority or a personal revision or okay. The reports, in detail, cover the following: 2,419 cotton mills; 964 woolen and worsted mills; 161 carpet and rug mills; 1,577 rayon and silk mills; 2,114 knitting mills; 161 jute, linen, flax, sisal, and hemp mills; 528 Canadian mills; 418 Mexican mills; 550 mills operating their own dye houses; 712 dyers, finishers, bleachers, and printers. Looms, spindles, cards, combs, and other machinery have been carefully tabulated by states and are shown in special tables. In cooperation with the United States Department of Commerce and other agencies and after considerable research there is a classification of cotton mills according to product manufactured in each mill.

"The Vanderbilt 1936 Rubber Handbook." Seventh Edition. Edited by W. F. Russell. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. Flexible cloth, 280 pages, 5¼ by 8 inches. Indexed.

The present edition of this popular rubber handbook contains three principal sections, preceded by a systematic treatise on rubber compounding wherein the authors, Paul I. Murrill and L. A. Edland, discuss the aims of compounding, and the functions of the materials used in both dry rubber and latex compounding.

The Vanderbilt line of rubber compounding materials is individually described in Section I as to general properties, uses, and applications.

Section II comprises 18 general articles contributed by American rubber research scientists on various topics of historical and technological importance, the discovery of vulcanization, outstanding dates in the history of rubber technology, important specifications, physical testing of rubber, latex types, water dispersions, etc.

Section III is a compilation of tables of useful data that will prove very helpful in factory practice.

The Vanderbilt company merits generous consideration as well as the thanks of rubber chemists and technologists everywhere for the contributions it is making to rubber knowledge broadcast by the *Vanderbilt News* and this rubber handbook.

"Chemical Engineering Catalog." (The Process Industries Catalog.) Twenty-first Annual Edition, 1936. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. Cloth, 913 pages, 9 by 12 inches. Illustrated.

The latest edition of this standard reference work for the process industries contains authoritative information regarding the products of several hundred concerns manufacturing engineering equipment and supplies for chemical and related industries including rubber. The volume comprises the following sections: Alphabetical Index, Trade Name Index, Equipment and Supplies Classified and Catalog Index, Classified Index of Industrial, Laboratory and Reagent Index, Manufacturers' Catalogs, and Technical and Scientific Book Section.

NEW PUBLICATIONS

"The Activator." The New Jersey Zinc Co., 160 Front St., New York, N. Y. The leading article in the August issue of this house organ tells how "Slow Curing Zinc Oxide May Be 'Fast.'" Also given is a complete description of the air bomb aging of rubber products as it is done in the labora-

(*Continued on page 64*)

Rubber Industry in America

OBITUARY

Frank Stoddard

FRANK STODDARD, 61, engineer at The Pocono Co., Trenton, N. J., died September 7, following a five-week illness. He belonged to the Association of Power Engineers. Surviving are his wife, two daughters, and a son. Burial was at Mount Holly, N. J.

L. Albert

LOUIS ALBERT, founder of L. Albert & Son, rubber machinery dealer, Trenton, N. J., died August 29. He retired from the firm about 25 years ago and was succeeded by his son, Israel H. Albert. L. Albert was born in Russia 81 years ago and moved to Trenton in 1888. The deceased was for many years identified with numerous Trenton charities. He is survived by three sons, two daughters, sixteen grandchildren, and eleven great-grandchildren. Burial was in Trenton.

William G. Bergen

WILLIAM G. BERGEN, retired rubber salesman and widely known in rubber circles, died September 21 at Mercer Hospital, Trenton, of a complication of diseases. He had long represented the Home Rubber Co., Trenton, and traveled over a large territory. Born in Dutch Neck, N. J., 75 years ago, he resided in Trenton for many years. Mr. Bergen was a member of the Trenton Lodge of Elks. A widower, he is survived by two brothers. Burial was in Riverview Cemetery, Trenton.

G. F. Hasslacher

GEORGE FRANK HASSLACHER, 40, of Snyder MacLaren Processes, Inc., 10 E. 40th St., New York, N. Y., was killed on September 15 when he fell sixteen stories from his office window. He had been at one time a director and assistant secretary of the former Roessler & Hasslacher Chemical Co., New York, founded by his late father.

The deceased leaves his wife, two sons, and his mother.

His clubs included Princeton, Short Hills, University, and Baltusrol Country.

P. R. McIntyre

PAUL R. McINTYRE, 30, a director of the Hope Webbing Co., Pawtucket, R. I., died September 21 from injuries received in an automobile accident. He was a graduate of Moses Brown School, Brown University, and Harvard Law School.

Arnold L. Schavoir

Arnold L. Schavoir

A SUDDEN heart attack was fatal, on August 26, for Arnold Lambert Schavoir, president of the Schavoir Rubber Co., manufacturer of rubber toys, balls, and specialties, Springdale, Conn. The deceased, who was born August 25, 1871, in Aachen, Germany, and came to this country in 1888, worked for a short time in a Stamford, Conn., plant before joining the Blickenderfer Mfg. Co., typewriter concern, where he developed the hard-rubber-type wheel then used on the firm's typewriters and also on the stock ticker. This invention was his first on rubber. Then in 1904 Mr. Schavoir started a tire repair plant which developed extensively through the repairing of tires taken in for adjustments for the major tire companies. From this field the firm branched into the manufacture of auto inner tubes, which was carried on until the start of the rubber toy business in 1916 and conducted and expanded until the present day. In 1934 Mr. Schavoir moved his business from Stamford to Springdale. During his lifetime he was granted numerous patents on processes, products, and machinery.

Mr. Schavoir was also very active in civic affairs and during the building of Halloween Park was chairman of the Park Committee of Stamford Common Council.

He leaves his wife, a son, a daughter, and a sister.

Funeral services were held at his residence in Stamford on August 28.

FINANCIAL

Company Reports

Dayton Rubber Mfg. Co., Dayton, O., and subsidiaries. Nine months ended July 31: net income after depreciation and other charges, $291,617, equal after preferred dividends to $1.42 a share on 156,245 common shares, compared with $43,471 or 16¢ a common share in the same period last year. No provision is made for federal surtax on undistributed profits.

Faultless Rubber Co., Ashland, O. Year ended June 30: net profit after depreciation, federal income taxes, and other charges, $127,134, equal to $1.94 a share on 65,450 no-par capital shares, against $164,168, or $2.50 a share, in the preceding year.

New Incorporations

Hillside Rubber Co., 790 Broad St., Newark, N. J. Capital $125,000. N. Geller and A. R. Rathbard, both of 790 Broad St., and B. Nusbaum, 186 Shepard Ave., all of Newark. Manufacture tires and tubes.

Re-Thread Tire Co., Inc., Rochester, N. Y. Capital $20,000. A. Heicklen, 8 Exchange St., Rochester. Tires, new and used.

(Continued on page 70)

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	Pfd.	$2.00 q.	Oct. 1	Sept. 16
Dominion Rubber Co., Ltd.	Pfd.	$1.75 q.	Sept. 30	Sept. 18
Garlock Packing Co.	Com.	$0.25 q.	Sept. 30	Sept. 19
Garlock Packing Co.	Com.	$0.25 extra	Sept. 30	Sept. 19
General Tire & Rubber Co.	Pfd.	$1.50 q.	Sept. 30	Sept. 21
General Tire & Rubber Co.	6% Pfd.	$1.50 accum.	Sept. 30	Sept. 21
B. F. Goodrich Co.	$5 Pfd., New	$1.25 in., q.	Sept. 30	Sept. 23
B. F. Goodrich Co.	7% Pfd.	Accum. (Cleared up by exchange)		
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$0.62 q.	Oct. 1	Sept. 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	6% Pfd.	$0.62½ q.	Oct. 1	Sept. 15
Jenkins Bros.	7% Pfd.	$1.75 q.	Oct. 1	Sept. 24
Jenkins Bros.	Com.	$0.50 inc.	Oct. 1	Sept. 24
Jenkins Bros.	Founders' Shares	$2.00 inc.	Oct. 1	Sept. 24
Okonite Co.	7% Pfd.	$1.50 accum.	Sept. 1	Aug. 17
Rex-Hide, Inc.	Com.	$0.50 inc.	Oct. 15	Sept. 30

EASTERN AND SOUTHERN

LAST month business volumes were somewhat lower, but the declines were occasioned largely by the holidays and were not of sufficient proportions to indicate a reversal of the usual September upturn in activity. The general outlook for the fall appears favorable.

Prior to the holidays industrial production continued at a relatively high level. In August factory employment was at the highest point since September, 1930, and the payroll index the highest since October, 1930. August, furthermore, was the fifth consecutive month during which steel ingot output was at about 70% of capacity.

The recent hurricane adversely affected business in some sections along the Atlantic Coast. In the South better prices for tobacco are a favorable factor; while cotton consumption, construction work, and manufacturing activity continue high. Employment increases reduced relief rolls somewhat, but job giving by private business remained below anticipation. Rainfall in some parts of the South and the opening of schools also helped business. The cotton crop in the Dallas district will be short, but with good prices prevailing farmers will realize more cash for this year's crop than for any within the past several years.

Reflecting the materially higher level of industrial production and general business activity, net profits of 253 leading industrial and mercantile companies for the April to June quarter of this year were 73% larger than for the corresponding quarter of 1935. Earnings of these companies, which indicate broad tendencies only and do not measure accurately the extent of improvement in profits of all industrial concerns, showed even larger increases over the corresponding months in the years 1931 to 1934, inclusive, and were slightly higher than in the second quarter of 1930. Available data for a smaller list of companies, however, indicate that profits of leading industrial and mercantile concerns remained about one-third smaller than in 1929 and about 15% less than in 1928. Especially large percentage gains were reported by the automobile, building supply, chemical and drug, machinery and tool, motion picture, and steel groups.

National Association of Waste Material Dealers, Inc., Times Building, New York, N. Y., inaugurated the second fall and winter season of its Luncheon Club on September 22 with a luncheon at Hotel Edison which marked a distinct change in the policy of the club during its first season. During the 1936-1937 season the club and its facilities will be open to all members of the waste material trade operating within the Metropolitan District of New York, and out-of-town dealers will also be welcome whenever they find it possible to be in New York on dates on which the luncheons are scheduled.

Metal Products Exhibits, Inc., Luncheon

Approximately 200 representatives of a variety of industries were guests of the Metal Products Exhibits, Inc., International Building, Rockefeller Center, New York, N. Y., at a luncheon September 15, 1936, which was arranged by T. J. Maloney, of T. J. Maloney, Inc., 381 Fourth Ave., New York, for the purpose of visually familiarizing industrialists with the progress of metallurgy and impressing them with the varied potentialities now existent of extended applications in their fields.

Herbert R. Simonds spoke briefly regarding the organization, growth to date, and future expansion plans of the Metal Products Exhibits, Inc., stressing particularly the spirit of helpfulness that this permanent exhibit and its sponsors have to aid industrialists to obtain the value of applying proper metals and derivatives to their arising and perhaps unsuspected needs.

Virgil D. Reed, assistant director of the United States Bureau of Census, Washington, D. C., was the principal guest speaker. In his instructive address Mr. Reed explained the scope of functions and the methods of operation of his department. He emphasized the value that the Bureau's facts afford to business management and invited a greater use of the facilities of the department by all industries.

Virgil D. Reed, Assistant Director of the United States Bureau of Census, Addressing Industrialists at Metal Products Exhibits, Inc., Luncheon at Rockefeller Center, New York

Dunlop Tire & Rubber Corp., Buffalo, N. Y., has reached a daily tire production of 1,500 casings. Production, however, is expected to be stepped up more now that the firm has made a contract with Sears, Roebuck & Co., Chicago, Ill. Dunlop is operating on its highest production schedule in recent years and has added considerably to its working force.

Benjamin Wasserman, recently arrested in New York for selling rubber "baloney dollars," was set free when the federal grand jury refused to indict him after it decided the bills were not sufficiently like the government's currency to warrant an indictment for counterfeiting.

Kelly-Springfield Tire Co., Cumberland, Md., on September 1 saw the end of an eight-day strike at its plant by members of the United Rubber Workers Union. Terms of the agreement are not available, but the strikers' objectives were wages on a parity with those paid at Akron, recognition of the union, shorter hours, and better working conditions.

American Society of Mechanical Engineers, 29 W. 39th St., New York, N. Y., will hold its annual meeting in New York, November 30 to December 4. A feature of the meeting will be a symposium on "Corrosion Resistant Metals in Design of Machinery and Equipment." The papers to be presented follow: "Introduction to Corrosion Resisting Metals," Dr. F. N. Speller, National Tube Co., Pittsburgh, Pa.; "Alloys of Aluminum," E. H. Dix, Jr., Aluminum Co. of America, New Kensington, Pa.; "Nickel and Nickel-Base Alloys," F. L. LaQue, The International Nickel Co., Inc., New York; "Zinc in the Chemical Industries," E. A. Anderson, The New Jersey Zinc Co., Palmerton, Pa.; "Lead," G. O. Hiers, National Lead Co., Brooklyn, N. Y.; "Cast Iron in Chemical Equipment," Dr. H. L. Maxwell, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; "Copper and Copper-Base Alloys," R. A. Wilkins, Revere Copper & Brass, Inc., Rome, N. Y.; "Corrosion Resistant Steel (Stainless Type)," J. H. Critchett, Union Carbide & Carbon Research Laboratories, Inc., New York.

The Twelfth National Exposition of Power & Mechanical Engineering will be held at Grand Central Palace, New York, N. Y., November 30 to December 5, 1936. Dynamic and interesting displays designed to give the visitor the maximum information in the shortest possible time will present every new development in the field of power generation and mechanical engineering equipment.

Wellington Sears Co., 65 Worth St., New York, N. Y., has launched a widespread advertising campaign publicizing the advantages of cloth towels over paper ones.

Lowman-Shields Rubber Co., 107 Water St., Pittsburgh, Pa., recently purchased as a site for permanent location a six-story building at 209 First Ave., Pittsburgh.

William M. Morse, editor emeritus of INDIA RUBBER WORLD, on September 2 left his summer camp at Pine Plains, N. Y., for the sunshine and fishing at New Port Richey, Fla.

Vulcanized Rubber Co., Morrisville, Pa., reports business has increased considerably in all departments. The company is now operating full time with all hands employed.

Armstrong Cork Co., Lancaster, Pa., which recently acquired the Stedman Rubber Flooring Co., South Braintree, Mass., has, according to President H. W. Prentis, Jr., appointed William G. Brooks general superintendent of the South Braintree plant. Mr. Brooks, formerly Stedman factory manager, will have complete charge of operations at the plant, where he will be assisted by O. G. Wheat, who has been made assistant general superintendent. Mr. Wheat was previously an industrial engineer in one of the Armstrong plants in Lancaster. M. A. Turner, former vice president and general sales manager of Stedman Rubber Flooring, has joined the Armstrong organization and will direct sales of Stedman Rubber Tile. He will make his headquarters in South Braintree. Charles F. Shell has been named chief chemist of the plant.

National Automobile Show exhibitors list grows more imposing from week to week. Nearly all available space on the four floors of Grand Central Palace, New York, N. Y., has been allotted. This "Pacemaker for American Industry" will open Armistice Day, November 11, and continue until November 18 (Sunday included). Twenty-four makes of passenger cars are listed for the first and second floors. Seven commercial vehicle exhibitors will occupy the larger spaces on the third floor, and thirteen makers of cabin-type trailers are thus far listed for the fourth. Accessories and parts on the third and fourth floors will be seen in greater profusion than at any show of recent years. More than 40 companies already are represented. Information may be obtained from Alfred Reeves, manager, 366 Madison Ave., New York, N. Y.

Du Pont News

Chaplin Tyler, assistant director of the publicity department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., recently addressed the Rotarians of Smyrna, Del., who were also shown the du Pont motion picture "The Wonder World of Chemistry." Mr. Tyler, whose subject was "Better Things for Better Living through Chemistry," discussed the company's position in the chemical industry and its relation to other industries, also its numerous developments including "Du Prene."[1] The picture showed how natural products are converted into the many du Pont goods, as rayon, dyestuffs, Cellophane, Duco, etc.

The du Pont company on September 23 featured "DuPrene," on its regular coast-to-coast radio broadcast, "The Cavalcade of America" (8 p. m., E. D. T., Columbia Network). "DuPrene" further is being widely covered in a series of regular trade paper advertisements; while the "DuPrene" display at the du Pont Exhibit, "The Wonder World of Chemistry," is creating much interest at the Texas Centennial Exposition. This policy of du Pont of educating the public on its many discoveries leading to products commanding much consumer demand is in decided contrast to the attitude of many rubber companies in keeping their developments deep secrets.

Marked increase in sales of "DuPrene" is progressing steadily. In fact they have reached a volume where present production facilities are being extended to the limit to meet the demand for the product. It is expected that an additional plant for the manufacture of "DuPrene" will be needed in the near future. Although sales and production have increased sharply, ample stocks of "DuPrene" are maintained to prevent any shortage or interruption of the manufacturing schedules of rubber goods manufacturers.

[1] Trade mark registered.

Fenner & Beane, member of leading exchanges, 67 Broad St., New York, N. Y., has taken on as a general partner James F. Shaw, who resigned May 1 as a partner of Abbott, Proctor & Paine, 120 Broadway, New York.

George H. Parker, manager of the Kentucky Actuarial Bureau, Louisville, Ky., has been appointed a member of the Fire Council of Underwriters' Laboratories, 207 E. Ohio St., Chicago, Ill.

United States Rubber Co., 1790 Broadway, New York, N. Y., recently completed manufacture of what is believed the largest roll of conveyer belt ever made. It will soon be handling copper ore on a new installation at a plant where the widest belt used previously was 48 inches. This new 60-inch record breaker is part of the equipment that makes possible handling approximately 20,000 tons per day.

MIDWEST

IN THE Midwest trade showed improvement last month as prices for farm products continue to mount and industry moved faster. Cooler weather and some rains aided in stimulating business. One deterrent influence is the strikes in certain sections of the Midwest, which is sharing labor trouble with the Pacific Coast. However in the former district a recent general survey of business seemed to indicate this part of the country is back to the "normal" of 1923. Politics seem to have had little effect on actual conditions. Provisions for jobs to drought victims in the St. Louis district has increased employment, but has not cut relief rolls; consequently civic organizations are preparing to make heavy demands this winter.

With assembly lines of several major automobile companies inactive and others suspending operations, the production of 1936 models is drawing to a close. The current model year has been very successful for motor companies, not only from the standpoint of the number of cars sold, but also from that of profits. According to Standard Statistics, nine automobile manufacturers reported profits of $178,302,000 in the first half of 1936, which include the most active sales months, compared with $98,785,000 in the same period of 1935, an 80% gain. While parts and accessory manufacturers did not do so well relatively, 28 companies showed for the six-month period a 25% increase in profits. These increased earnings have resulted in larger dividend disbursements to stockholders, and there has also been a tendency to return part of the profits to employes either in the form of bonus or vacations with pay. Output, however, declined in September as plant changes were made and parts stored in preparation for the 1937 season, which will be formally inaugurated in November with the New York Automobile Show.

The 1936 Automotive Service Industries Show, to be held on Navy Pier, Chicago, Ill., December 9 to 13, has broken all of its own records for number of exhibitors and amount of display space required, according to results of the space drawing in Chicago, September 11, under the auspices of the Joint Show Operating Committee, representing the three sponsoring associations, who will also hold their annual conventions in conjunction with the show. This year the National Standard Parts Association will meet December 7 and 8 at the Sherman Hotel; the Motor and Equipment Wholesalers Association on the same dates at the Stevens Hotel; and the Motor and Equipment Manufacturers Association on December 10 at the Blackstone Hotel. Purpose of the Automotive Service Industries Show is to bring manufacturers and their jobbers closer together for discussion of their

(*Continued on page* 70)

NEW JERSEY

NEW JERSEY rubber manufacturers continue to enjoy a good volume of business with a general increase in production of rubber tiling and cloth. The only product showing a decrease was jar rings; manufacturers declare this decline due to the drought.

The Hamilton Rubber Mfg. Co., Trenton, has let a contract for a one-story brick addition.

Acme Rubber Mfg. Co., Trenton, reports a good volume of business for the past few weeks.

Crescent Insulated Wire & Cable Co., Trenton, will erect a two-story factory addition, 60 by 110 feet.

The Pocono Co., Trenton, now operates seven days a week with three shifts. Holland Slusser, company executive, has been on a business and pleasure trip to California.

Atlas Supply Co., Newark, according to President F. H. Bedford, Jr., is amply supplied with tires to cover its requirements for some time. This statement followed news of the cancellation of the company's contract with The B. F. Goodrich Co., Akron, O., which with the United States Rubber Co., 1790 Broadway, New York, N. Y., had been supplying the Atlas company with tires sinces its formation. It is understood that U. S. Rubber will now manufacture all tires for the Newark concern.

Thiokol Corp., Yardville, reports a greater demand for rubber plates to take the place of metal ones. The company is increasing production and turning out some new products.

H. L. Fisher Resigns

Harry Linn Fisher recently severed a ten-year connection with United States Rubber Co. when he left the development department of United States Rubber Products, Inc., Passaic, N. J., where he had been employed as a research chemist. He has joined the combined research and development departments of the Air Reduction Co. and United States Industrial Alcohol Co., both of Stamford, Conn.

Dr. Fisher was born in Kingston, N. Y., January 19, 1885. He holds the following degrees: B.A., Williams College, 1909; M.A., Columbia University, 1910; Ph.D., Columbia, 1912.

During 1910 he was an assistant in organic chemistry at Columbia and the next year became an instructor in chemistry at Cornell Medical College. Then he returned to Columbia as an instructor in organic chemistry. In 1919 he signed with The B. F. Goodrich Co., Akron, O., as a research chemist and late in 1926 ended that association to take a similar position with U. S. Rubber's General Laboratories.

Among the organizations in which he holds membership are the American Chemical Society, Phi Beta Kappa,

H. L. Fisher

Sigma Xi, and Phi Lambda Upsilon. Dr. Fisher is quite prominent in A. C. S. affairs, having served as secretary of the Organic Section, 1915-1919, as chairman of the Akron Section, 1925, and as chairman of the Rubber Division, 1927-1928, as well as on many committees of local groups. He was, besides, secretary of the Organic Section, Eighth International Congress of Applied Chemistry, held in New York, N. Y., in 1912.

Many patents on organic and rubber chemistry are in his name. Dr. Fisher has also written innumerable articles and addressed countless gatherings on these subjects.

Jos. Stokes Rubber Co., Trenton, experienced a slight decline in business at its Canadian plant. Milton H. Martindell, vice president and treasurer, was on a business trip to the Far West.

The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., soon will erect a $100,000 building on its Passaic property, according to Colonel Arthur F. Townsend, chairman of the board. It will be a three-story structure with a basement and will replace an old building, a one-story saw-tooth roof mill, which is to be ripped down. Colonel Townsend said the new structure, which will be approximately 100 by 100 feet, will be used as a storehouse for raw materials and manufactured goods. It will relieve congestion in the older portion of the manufacturing department, which it will adjoin.

Near Para Rubber Co., Trenton, is witnessing a greater demand for reclaimed material.

Mercer Rubber Co., Hamilton Square, now functions with a full force. The concern reports a great decrease in jar rings, evidently due to the drought.

Essex Rubber Co., Trenton, finds a decided improvement in business in heels and soles and mechanical goods.

The Thermoid Co., Trenton. President F. W. Schluter has announced a recapitalization plan to clear up arrears in dividends and sinking fund obligations on preferred stock and to make possible payment of dividends. A summary of the proposed plan sent to stockholders follows. Present 7% cumulative convertible preferred stock is to give way to a new convertible preferred stock, each share of present preferred to receive 1⅓ shares of new convertible preferred. The new preferred will be convertible into three shares of common and will carry cumulative dividends at the rate of $3 a year beginning September 15. Besides being convertible into three shares of common the new preferred will be entitled to a special dividend of three shares of common stock. This will provide four shares of common stock for each present share of preferred to make up for back dividends. The announcement said the plan was developed in view of improvement in earnings in the past two years, "and as a preliminary step looking to the successful refunding of the $2,518,500 of five-year 6% notes maturing February 1, 1937." The plan will be considered by stockholders at a special meeting soon to be held.

Puritan Rubber Co., Trenton, continues with a night shift in the production of rubber tiling, on which it is very busy.

Ferodo & Asbestos, Inc., New Brunswick, will build an addition to its plant on Codwise Ave. to cost $50,000. The company, which manufactures brake lining and other automotive accessories, began operations ten years ago and now employs nearly 200 workers. The concern occupies a 20-acre plot.

National Safety Council, 20 N. Wacker Dr., Chicago, Ill., will hold its twenty-fifth national safety congress and exposition at Atlantic City, N. J., October 5 to 9. Details of the program were given in our August issue, page 54.

New Publications

(Continued from page 60)

tories of the company at Palmerton. A working drawing of the apparatus used is reproduced. Besides additional information appears on the adhesion of rubber to zinc alloy die castings.

"Gastex Folder." General Atlas Carbon Co., 60 Wall St., New York, N. Y. The importance of transportation facilities as a factor in world civilization and the development of the wagon, steam engine, automobile, and airplane are sketched. Rubber development is duly credited for its part in improving transportation facilities aided by the introduction of carbon black.

OHIO

WITH the relatively high level of automobile production and heavy replacement sales tire manufacturers have enjoyed a good volume of business. Their tire stocks have been cut very materially during recent months.

Machine tool orders declined somewhat, chiefly as a result of a drop in foreign requests and completion of orders for automobile plant equipment. The local steel industry continues at a high rate with little change. All branches of the clay industry, furthermore, have experienced a marked increase in demand.

Goodrich News

By the action on September 9 of the holders of more than the necessary two-thirds of each class of stock in a special meeting called in The B. F. Goodrich Co.'s offices at 230 Park Ave., New York, N. Y., each share of 7% cumulative preferred stock was changed into 1.4 shares of a new 5% cumulative preferred stock without par value, and one-half share of common stock. The plan had the approval of 73.9% of the preferred stock and 71.2% of the common. Approval of the plan by the stockholders readjusts the capital stock structure of the company to take care of the accumulated arrearage of preferred dividends and removes the annual retirement requirement of the former 7% preferred stock.

Under the new structure the capital stock consists of 430,386 authorized shares of $5 preferred stock without par value, of which 412,031.2 shares will be outstanding; and 4,147,154 authorized shares of common stock, of which 1,-314,296 will be issued consisting of 1,156,101 shares now outstanding and 147,154 shares issued as a result of the change.

Capital Structure Changes

Closely following the stockholders' approval of the plan, company directors declared a quarterly dividend of $1.25 a share on the new $5 cumulative preferred stock. This dividend is the first paid by Goodrich in six years. Immediate declaration of a dividend reflects the improved earnings of the company and carries out the intention expressed when the readjustment plan was announced.

The New York Stock Exchange has admitted to the list Goodrich no-par $5 cumulative preferred stock and suspended from dealings Goodrich 7% cumulative preferred stock.

Greater Deicer Sales

A prediction that sales of airplane deicers, the rubber industry's most distinctive contribution to safe flying, for the 1936-37 "cold" season, would run more than 300% greater than during last year, was made recently by J. D. Tew, president of the Goodrich company, Akron, exclusive manufacturer of the device. The deicers, which consist of rubber facings for the leading edges of plane wings and stabilizers and which prevent formation of ice crusts by alternate inflation and deflation of parallel tubes, have advanced in four years from a trial installation on one plane of the Transcontinental & Western Air Line to the point where they are now standard equipment on practically all commercial air lines, Mr. Tew said. Besides this steady adoption by commercial lines the United States army air corps is adopting deicers for army planes, and it is understood that an appreciable percentage of the current sales increases may be attributed to contracts for deicer installations in army aircraft.

Goodrich also notes a rapidly expanding market for propeller deicers, developed under a program finished only last fall and sponsored by the U. S. Department of Commerce, Bureau of Air Commerce, Mr. Tew said. This device is a "slinger ring" which fits over the propeller hub and feeds an anti-freeze solution over the surface of the propeller blades, where ice formations are extremely hazardous. The allied development of deicers and the propeller anti-freeze device is regarded by Mr. Tew as constituting one of the greatest contributions made in years to the rapidly expanding commercial aviation field.

Enormous Vulcanizer

The World's Largest Vulcanizer Recently Installed at the Goodrich Plant in Akron

The largest vulcanizer ever constructed for the rubber industry, more than 53 feet long and weighing 90 tons, was installed in Goodrich's Akron factory. The unit is of metal more than an inch thick, and the door, operated by a hydraulic lift, weighs 15 tons. The huge vessel, with a cubic capacity of 65,000 gallons, is 15 feet in diameter and will be employed by Goodrich to cure rubber lined tanks. The vulcanizer is large enough to admit an entire standard sized railroad tank car.

Goodrich has pioneered in the lining of tank cars for the transport of various chemicals, and the new vulcanizer will be placed in service shortly after the installation is completed in September.

The vulcanizer was designed by the Goodrich engineering department. It was built by The Adamson Machine Co., 730 Carroll St., who then sent it to the Biggs Boiler Works Co., 1007 Bank St., both of Akron, for its shell. The vulcanizer was moved to the Goodrich plant on a special eight-ton rig mounted on 16 large tires and drawn by three tractors.

Contract Announcements

President Tew on September 11 announced that the contract under which Goodrich manufactured tires for the Atlas Supply Co., 744 Broad St., Newark, N. J., which were distributed mainly through retail outlets of Standard Oil companies, has been cancelled.

Goodrich has awarded a contract for the construction of a tire plant at Oaks, Pa. Work is to start at once, but the size of the plant was not revealed.

Personnel Changes

W. W. Gill has been appointed assistant manager of the truck and bus tire department, according to C. B. O'Connor, general sales manager of Goodrich's tire division. Mr. Gill succeeds A. W. Sherlock, named sales supervisor in the New York district. Mr. Gill entered the sales branch of the tire industry in 1920. He was manager of the na-

tional accounts division of the truck and bus tire department since 1933 and before that for three years had been national representative in the New York metropolitan area.

Willis F. Avery was elected assistant secretary of the Goodrich company, in charge of patent, trade mark, and copyright work, at a recent meeting of the board of directors. Since joining the company in 1924 he had been in charge of chemical and compounding cases in the company's legal department.

Firestone Tire & Rubber Co., Akron, is reliably reported looking over the Detroit field with the possibility of having a plant there.

Hankins Rubber Co., Massillon, with equipment and buildings recently was sold at auction to a Detroit group for $13,000. The new owners, it is said, will reopen the plant, hire former help, and continue the manufacture of rubber gloves and druggists' sundries, besides adding some new lines.

Dayton Rubber Mfg. Co., Dayton, soon will build an extension to its warehouse on W. Riverview Ave., affording 50,000 more feet of floor space. The additional quarters are necessary to store finished products and raw materials now housed in the firm's downtown building.

Ohio Rubber Co., Willoughby, recently finished work on a complete new hospital unit and a personnel and educational department suite. Seeking larger space for more efficient operation of its three divisions, the company had these additions put in the front of the plant. With the completion of the hospital unit more extensive equipment for the treatment of employes will be purchased. Under Dr. Warren Payne, plant physician, the dispensary will become departmentalized. Adjoining the hospital section are the new offices for the plant personnel and part of the educational departments. C. W. Ufford is personnel manager.

General Tire & Rubber Co., Akron, recently purchased the plant and property, covering 30 acres, of the former Service Motor Truck Co., Wabash, Ind. W. E. Fouse, General vice president, declared an effort would be made to start a $20,000 repair and remodeling program on the plant soon and that actual operation should be under way by December 1. The company expects to use 200 persons on the opening day, and it was stated that by early in 1937 at least 500 persons probably would be employed. The company will manufacture here all kinds of rubber goods, except a general line of tires. Odd-size tires also will be made in the Wabash plant.

General Tire, because of the great difficulty experienced in getting payments for tires sold the State of Georgia, through its Atlanta offices, has instructed all dealers of the state to demand cash on all purchases to the state. Executives at the Atlanta offices are E. V. Zumwalt and C. R. Firestone.

H. A. Flannery

Mechanical Engineer

Harold A. Flannery, manager of the engineering department, Goodyear Tire & Rubber Co., Akron, was born in Horseheads, N. Y., April 3, 1894. He graduated from Cornell University in June, 1917, with a B. S. degree.

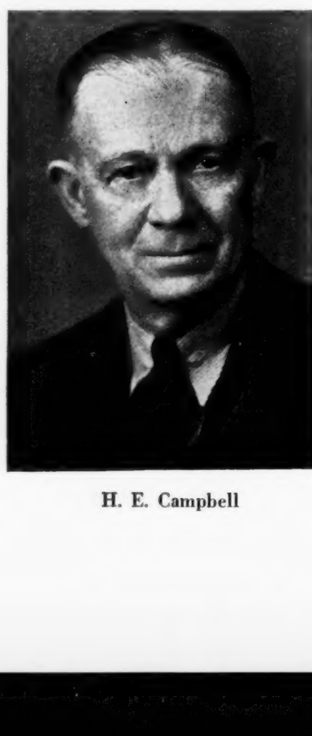
Mr. Flannery joined Goodyear in 1917, first working on tire designs and then in the development department. He was appointed division superintendent, Plant II, August 16, 1927, but the next year was sent to England as general superintendent of the company's factory at Wolverhampton. Mr. Flannery returned to Akron last year as manager of the engineering division.

His address is 307 Afton Ave., Akron.

Division Superintendent

Harry E. Campbell, superintendent, mechanical goods division, Goodyear Tire & Rubber Co., Akron, has had a long and successful career in the rubber industry. His initial appearance, in 1895, was as foreman of the belt department of The B. F. Goodrich Co., Akron, and from 1901 to 1909 he held a similar job with the Republic Rubber Co., Youngstown, O. He then went to Buffalo as superintendent of the Atlas Rubber Co. In 1911, however, he signed as superintendent of the tire department of the Lee Tire & Rubber Co., Conshohocken, Pa. Mr. Campbell was hired by Goodyear on February 6, 1913. First he was shift foreman for solid tires; then he spent six months in the efficiency department. Next he was sent to the mechanical goods department and became division superintendent in 1917.

Mr. Campbell was born October 15, 1877, in Akron and attended the local grade and high schools. He can be reached at 116 W. Center St., Akron.



H. E. Campbell

Goodyear Notes

Goodyear Tire & Rubber Co., Akron, at a meeting of the board of directors in Cleveland approved a plan for submission to stockholders, at a special meeting in Akron on November 2, for the adjustment of accumulated dividends on the company's $7 first preferred stock. Arrearages on this stock amount to $11.25 per share as of October 1. The plan provides for the issuance of new $100 par, 5% convertible preferred stock, senior to the present first preferred. Under the plan each share of the present first preferred stock will be exchanged for one share of the new senior preferred, plus one-third share of common stock. The new senior preferred stock will carry dividends from February 23, 1936. The effect of this policy is that preferred stockholders who exchange their stock would receive, in addition to the regular dividends of $1.25 for the last quarter of 1936, an extra dividend of $3 on the new stock. The conversion provision of the new senior preferred gives the holder the right to exchange it as follows: during the first two years, three shares of common for one share of senior preferred ($33.33 per share); during the next two years, five shares of common for two shares of senior preferred ($40 per share); during the next two years, two shares of common for one share of senior preferred ($50 per share); during the next two years, three shares of common for two shares of senior preferred ($66.66 per share); during the next two years, four shares of common for three shares of senior preferred ($75 per share).

Goodyear has notified the New York Stock Exchange of a proposed increase in authorized capital stock by 1,000,000 shares of no-par serial preferred stock, the initial series to consist of 782,418 shares of $5 convertible preferred, and a decrease of 996,408 shares of 7% cumulative preferred stock. The company plans to change the title of the present first preferred stock to second preferred stock.

Goodyear, it is reported, recently purchased the large plant of the National Acme Co., Windsor, Vt., for manufacturing tires and tubes. Work is under way in preparing the plant for

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NEW ENGLAND

THE business situation in New England continues practically unchanged. Business was unusually active during the summer. While there has been some decrease from the peak, general activity runs well above that of a year ago. The natural forces of recovery following several years of severe depression account largely for the vitality and vigor of the present movement. Some manufacturers report operations at the highest level since 1929, and the sentiment is more optimistic than it has been in months. In some sections plants, including those of rubber manufacturers, are operating with more employes than has been the case for some time. Heavy buying of cloth has stimulated activity in the cotton textile industry, with prices advancing. Shoe manufacturers also continue busy; while miscellaneous operations, particularly in metals and machinery, are better than they have been since 1929 and 1930. Building operations continue at approximately double the level of recent years.

Regular monthly reports of various industrial surveys in Rhode Island indicated for August a very encouraging improvement in the rubber manufacturing industry as compared with August, 1935. Payroll withdrawals by rubber interests was $228,034, 0.8% below the July total, but 16.5% over that of August, 1935. The rubber industry also showed a 72.5% increased electrical power usage.

Sixteen corporations, firms, and individuals representing the manufacturing rubber industry and its allied branches are included in the annual tax list of the City of Providence against whom taxes have been assessed to the amount of $50,000 or more each. Included among these sixteen are seven assessed on a valuation of $1,000,000 or over. The property valuation of this group totals $20,835,940. The group includes American Multiple Fabric Co., $117,580; Walter S. Ballou, $112,440; Mary A. Banigan, $54,000; The Bourn Rubber Mfg. Co., $120,440; Brown & Sharpe Mfg. Co., $8,035,780; James Banigan estate, $1,027,320; Davol Rubber Co., $1,262,520; International Braid Co., $1,243,860; Nicholson File Co., $1,746,600; Nicholson family interests, $1,321,280; Phillips Baker Rubber Co., $251,000; Phillips family, $935,480; Providence Insulated Wire Co., $233,780; United States Rubber Co., $3,476,900; United States Rubber Products, Inc., $629,500; and Byron S. Watson, $267,460.

H. S. Doty is associated with the Alfred Hale Rubber Co., North Quincy, Mass. Mr. Doty, who has been connected with the rubber industry during the past few years, was formerly chief chemist of the Manhattan Rubber Co., Passaic, N. J., and later head of the Dovan Chemical Co., New York, N. Y.

F. E. Rupert

Chief Chemist

It is interesting to note the rather exceptional grounding in science acquired by Frank Everett Rupert in leading American universities and colleges as a basis for his success as a technologist.

He is a native of Mendon, N. Y., born November 16, 1889. He was educated at Hobart College, University of Michigan, and pursued graduate work at the universities of Wisconsin, Columbia, and Harvard, holding the degrees: University of Michigan, B.S. (1912) and University of Wisconsin, M.S. (1915). Subsequent to his scientific training he taught chemistry (1912-1922) at Mansfield State Teachers College, Simmons College, Carnegie Institute of Technology; in Chemical Warfare Service (1922-1924); Fisk Rubber Co., research, (1924-1927); Physical Testing Committee, Rubber Division, American Chemical Society, at Bureau of Standards (1927-1930); also taught evening sessions in industrial chemistry at Northeastern University (1920-1922) and at George Washington University (1928-1929.) His work at the Bureau of Standards on standard procedures for laboratory testing of rubber compounds has been published and included in A.S.T.M. specifications.

His memberships include Phi Phi Delta Fraternity, A. C. S., A.S.T.M., and Chamber of Commerce of Pawtucket, R. I. He is president of the Rhode Island Rubber Club and major in Chemical Warfare Reserve. His present position is chief chemist, Anaconda Wire & Cable Co., Pawtucket.

Mr. Rupert resides at 50 Boylston Ave., Providence, R. I.

The Washburn Wire Co. is building a new drying house at its plant on Bourne Ave., East Providence, R. I. Officials report an encouraging improvement in the company's business.

The Arbeka Webbing Co., Roosevelt Ave. and Bates St., Pawtucket, R. I., maker of narrow elastic fabrics, has arranged for an expansion program by which the present working force of 80 persons will be considerably increased. A one-story wing, 36 by 72 feet with basement, has been contracted for which will be ready for occupancy about mid-November, and is to cost around $10,000. The present building is 100 by 203 feet. George N. Proctor and Frank W. Hastings are president and treasurer, respectively, of the concern.

United States Rubber Products, Inc., Bristol, R. I. The annual outing and field day of the finishing, shipping, and test laboratory departments was held last month. An elaborate program of field sports was conducted with numerous appropriate prizes. Chowder was served for luncheon, and the clambake was opened at 4 o'clock. A number of the plant officials were guests and made brief addresses. At the same time the barb wire and cable department employes of the plant also conducted their annual outing, with William Manchester in charge as bakemaker and William Butler, chairman of the committee of arrangements. Competitive sports and a clambake furnished the features of the program.

Phillips Baker Rubber Co., Providence, R. I., employes recently held their ninth annual outing marked by field sports, a clambake, baseball, and dancing. More than 1,100 persons attended. After the bake a wristwatch was presented to Charles H. Baker, vice president and general manager, and a brief case was given to Alfred D. Langley, factory manager, by the employes.

The Davol Rubber Co. is erecting a new steel storage building, 28 by 44 feet, at its plant, 69 Point St., Providence, R. I. The foundations are being established at this time, but the building itself will be erected later, specifications for which have already been prepared.

Schavoir Rubber Co., manufacturer of rubber toys, balls, and specialties, Springdale, Conn., which recently suffered the loss of its president, Arnold L. Schavoir, will be carried on as usual by the latter's widow, treasurer of the company since its inception, and their son, Fred. H. Schavoir, for many years vice president and general manager of the concern.

David Roy Cutler, development manager, Rubber-Gel Products Corp., North Quincy, Mass., subsidiary of the Kaysam Corp. of America, One E. 57th St., New York, N. Y., was married to Patience Brewster Widger, September 12, 1936. Following their honeymoon at Lake Placid Club, Lake Placid, N. Y., Mr. and Mrs. Cutler will reside at 20 Colby Rd., Braintree, Mass.

Rhode Island Rubber Club

THE fall meeting of the Rhode Island Rubber Club was held September 25 at the Pawtucket Golf Club. Over 100 members and guests were in attendance. Fifty-two players took part in the golf tournament during the afternoon. First prize winners in this competition were R. S. Newell, low gross for members; Brainbridge, low gross for visitors; R. Edson, low net; J. I. Murry, blind bogy; W. H. Morley, driving contest; E. I. Bosworth, putting contest.

After the dinner the awards of *The Rubber Age* golf cups were made to winners of the tournaments during the year. The team cup was won by the Anaconda Wire & Cable Co. The individual low net cup was won by James Reek, of the same company.

J. H. Davidson, of Farrel-Birmingham Co., Ansonia, Conn., gave an interesting talk on "Transmissions as Related to the Rubber Industry" in which he outlined the development of power drives for rubber machinery from water-wheels, steam engines, central stations, followed by the use of electric motors. The first closed gear drive was installed in 1902. Constant improvements since then have resulted in the helical gear drives and the Sykes tooth gears introduced in 1923. This series of advancements in power application has made possible the use of heavier and more efficient equipment utilized in the rubber industry today.

William Zinsser & Co., New York, N. Y., contributed a showing of a moving picture depicting old and new methods of manufacturing shellac. A representative of the company answered questions concerning the use of shellac in rubber.

Rhode Island Rubber Club expresses its appreciation to the following firms who donated money or prizes: Southeastern Clay Co., Philipp Bros., Inc., Wishnick-Tumpeer, Inc., INDIA RUBBER WORLD, L. G. Whittemore, Inc., E. I. du Pont de Nemours & Co., Inc., Naugatuck Chemical, N. E. Paper Tube Co., R. T. Vanderbilt Co., Anaconda Sales Co., Flintkote Corp., Pequanoc Rubber Co., H. Muehlstein & Co., Inc., Columbia Alkali Corp., Halowax Corp., and Monsanto Chemical Co., Rubber Service Laboratories Division.

Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa., have opened an office at 422 Chamber of Commerce Bldg., 80 Federal St., Boston, Mass., staffed for consulting and sales engineering service to those having problems of instrumentation in manufacturing processes, laboratories, power plants, or educational institutions. The firm's complete line of measuring, recording, and controlling instruments, as well as its electric heat treating furnaces will be handled through this office.

S. H. Tinsley

Rubber Technologist

Samuel Hildrup Tinsley, rubber chemist and technologist, was born at Gloucester, Va., October 23, 1897. Following 11 years of elementary and preparatory school study his education was completed after eight years of collegiate work, as follows: Virginia Military Institute (two years); University of Virginia (three years); Massachusetts Institute of Technology (three years). His degrees are B.S. (1921) and M.S. (1922), University of Virginia, and Ph.D. equivalent, M.I.T. (1925).

Mr. Tinsley was chief chemist and technical director for Respro, Inc., Cranston, R. I., from July 1, 1925, to January 1, 1936. From the latter date to the present he has been plant manager of Coated Textile Mills, Inc., Pawtucket, R. I. He was elected secretary-treasurer of the Rhode Island Rubber Club at its last annual meeting June 4. He lives at 37 Strathmore Rd., Edgewood, R. I.

Converse Rubber Co., Malden, Mass., through its directors recently approved a plan of voluntary reorganization of the financial structure of the company, necessitated by the effects of the depression and unfavorable competitive conditions in the rubber shoe industry. Preferred stockholders, who with few exceptions also own common shares, have been solicited for their approval of the plan whereby preferred accruals would be taken care of and dividend payments resumed. Unpaid accumulated preferred dividends amount to $12 a share. Plan calls for issuance of a new $45 par voting preferred in exchange for present $33 par preferred, share for share. When the plan is effective, a quarterly dividend of 50¢ a share will be paid as of July 1. The new preferred will be entitled to $46.50 a share in liquidation. Dividends of $2 a year will be paid, cumulative from July 1. There are at present outstanding 17,744 shares of preferred on which net profit for the year ended March 28, 1936, was equal to $8.87 a share.

Carleton W. Short

Carleton W. Short, born at East Providence, R. I., June 26, 1894, received his education in the public schools of that place and at the Rhode Island State College where he graduated in 1916, B.Sc. in Chemical Engineering. During the World War he served with the American Expeditionary Force (1917-18). He was chemist in cotton textiles (1919-20) and in vegetable oil refining (1920-21) before entering the services of the United States Rubber Co., as chemist and technologist in footwear and insulated wire manufacturing departments (1921-24); operating department, U. S. Rubber, footwear (1924-30); chief chemist, U. S. Rubber, insulated wire (1930-35); chief engineer, U. S. Rubber Products, Inc., (1935-36).

Address: 1266 South Broadway, East Providence, R. I.

The Fisk Rubber Corp., Chicopee Falls, Mass., is said to have received several large orders, necessitating putting a great many employes to work and soon hiring many others, despite the fact that the firm has been working exceptionally well all summer.

A. G. Spalding & Bros., sporting goods manufacturer, Chicopee Falls, Mass., following its recent annual summer seasonal layoff, is recalling its employes, and the factory is expected to boom all winter.

Ohio

(*Continued from page 66*)

its new owner. At least 400 workers will be hired when rubber manufacturing starts. The move is understood to be a direct result of the recent strikes at Akron.

As part of this move to decentralize its operations, Goodyear recently increased the productive capacity of its Gadsden, Ala., plant from 6,000 to 8,000 tires daily.

Seiberling Latex Products Co., Akron, recently settled a ten-day strike when union workers voted to accept company terms, involving pay increases, including a boost of 25% in day rate in case of breakdown of machinery, an increase of 10% to all workers making 50¢ an hour or less, and a 5% increase to those making more than 50¢ an hour.

A. Schulman, Inc., Akron. A disastrous fire destroying property to the estimated value of $225,000 occurred during the night of September 22 in the adjoining warehouses of A. Schulman, Inc., dealer in crude and scrap rubber and hard rubber dust, and the Klages Coal & Ice Co. The fire, of unknown origin, started in a pile of rubber scrap in the rear of the Schulman warehouse. The flames quickly ignited cars on the railway siding and rapidly passed on to consume the stock of crude rubber stored in the

(*Continued on page 70*)

Rubber Industry in Europe

GREAT BRITAIN

If negotiations under way are successful, all shares of the India Tire & Rubber Co., Ltd., will be acquired by the Dunlop Rubber Co., which already holds 59% of the shares. The India company will then be voluntarily wound up, but manufacturing will be continued at the Inchinnan works by Dunlop, who will, if possible, extend operations, while business will be carried on in the name of the India Tire & Rubber Co. Dunlop offers to buy the whole of India Tire's assets on terms permitting the latter to pay shareholders in liquidation 27s. 6d. for each preference share together with 3s. 3d. for each ordinary share, all expenses to be borne by the purchaser. If the scheme is carried through, Dunlop will allot to any shareholders in the company, who apply within two weeks from the passing of the resolution to wind up, ordinary shares at a price of 30s. for every three shares of 6s. 8d. each. These shares will be converted into stock, making the price of £1 of stock, 30s. The market price on August 10 was around 37s.

Rubber mudguards are to be fitted to 100 Leyland buses being built for London transport. The guards, designed and made by Dunlop, are built up in sections, and the parts most exposed to impact are of dull-black rubber.

Lido Products, Ltd., has been formed with a capital of £1,000 to manufacture and sell the recently patented crepe rubber Lido Sandals, and "Redrub" scrubbers for the body. The directors are David P. O'Connor and Paul L. Liddell.

The Second International Congress of the International Association for Testing Materials will be held in London April 19 to 24, 1937.

Latex concentrated by the Utermark centrifuging process and containing 60% dry rubber, is to be marketed under the name "Cenex" by the recently formed Consolidated Rubber (Latex) Ltd., 3-5 Rood Lane, London E.C.

The new stand of the Arsenal Football Club, it is understood, is to have 4,000 seats cushioned with Dunlopillo. In addition a Newcastle-on-Tyne firm, Stephenson Clarke & Associated Cos., Ltd., after testing Dunlopillo mattresses and pillows on one of its vessels, has decided to order similar products for all its ships, also for those now under construction.

A new expansion jointing material of cork and rubber vulcanized together is marketed by Kautex (Plastics) Ltd., Edgeware, Middlesex. It is claimed to have several advantages, as durability and the power to withstand drastic changes of temperature without spewing or shrinking.

A course of 18 lectures on rubber will be given at the City of London College beginning September 24, 1936. The lectures, delivered on consecutive Thursday evenings, are divided into three sections. The first will include 12 lectures on the production and consumption of rubber, by George Rae, of Harrisons & Crosfields, Ltd.; the second, two lectures on marketing rubber, by A. D. Robb, of Hymans Kraay & Co.; and the third, four lectures on the character, grades, and defects of raw rubber, by W. H. Stevens, consulting chemist. At the conclusion of the course an examination will be held, and the best student will receive a prize of £5.5s., offered jointly by the Rubber Growers' Association, Ltd., and the Rubber Trade Association of London.

Harry Barron, Ph.D., B.Sc., A.I.C., A.I.R.I.(Sc.), industrial consultant, recently opened a new laboratory and rubber workshop at 8/9 Bishop's Court, Chancery Lane, London, W. C. 2, where he specializes in the problems of the rubber and plastics industries and has installed the necessary plant for handling these materials.

Malayan Information Agency has changed its address to Malaya House, 57 Trafalgar Sq., London, W.C. 2.

GERMANY

Discussing "Blacks for the Rubber Industry" at the ninth general meeting of the German Rubber Society at Munich, Dr. F. Stapelfeldt stated that the problem for Germany was to discover suitable raw materials in sufficient quantity to provide the German rubber industry with adequate supplies of useful, home produced, active-gas blacks. One such material has already been found in naphthalene from which, it seems, blacks have been produced equal in quality to the American products now employed. Experiments have also been undertaken to obtain active blacks from acetylene. Practical tests carried out by large rubber works, it is claimed, show that Degussa Gas Black C.K.3, produced by the Deutsche Gold-und Silberscheideanstalt, and the active black V.N.500, produced by the I. G. Farbenindustrie, excel American gas blacks in certain respects. These German blacks can also be used with synthetic rubber.

Gummi-Zeitung in a recent review of German raw materials for the rubber industry, revealed Germany well able to produce most of her requirements in chemicals, softeners, mineral fillers, pigments, and colors, all of good quality. Indeed it is claimed that German active zinc oxide and a special zinc stearate are of a quality so far unequaled by any foreign product. Rubber and cotton, of course, have to be imported; but the development of Buna is a great step forward, although it is admitted that for the present it is still rather expensive and is not available in sufficiently large quantities. Until the problem of output is solved, and with it the cost factor, the use of Buna must necessarily be restricted. While cotton is still indispensable for many articles, artificial fibers could be substituted in goods not subject to severe mechanical strain, as sheeting, raincoats, dress shields, etc.

Since its reorganization about two years ago, the business of the Fulda Gummiwerke A.G., Fulda, has improved markedly. The 1935 report shows net profits of 375,776 marks against 102,735; while a 6% dividend instead of 5% was paid.

The Dartex A.G. fur Kautschuk Verarbeitung, Frankfurt a.M., a subsidiary of the Metallgesellschaft, is capitalized at 550,000 marks. Business during the past few years has been unfavorable, and although 1935 showed some improvement, that year too closed with a loss, this time of 2,268 marks against 33,600 marks, the total loss now being 190,252 marks.

AUSTRIA

Austria's business in rubber goods increased the first half of 1936 as compared with the first half of 1935. Total imports were 6,092 quintals, value 3,830,000 schilling, against 5,604 quintals, value 3,631,000 schilling. However the increase in exports more than made up for this difference, the figures being 15,011 quintals, value 7,992,000 schilling, against 12,929 quintals, value 7,644,000 schilling. The small increase in the value of the exports as compared with the quantity fully reflects the difficulties of export business today and the price cutting resorted to in order to sell goods abroad.

Imports of crude rubber rose from 17,456 to 19,297 quintals. The chief imports of manufactured goods were automobile tires, which rose from 2,035 quintals, value 802,000 schilling, to 2,054 quintals, value 739,000 schilling; other tires rose from 419 quintals, value 192,000 schilling, to 635 quintals, value 284,000 schilling; belting, 213 quintals, value 176,000 schilling, against 179 quintals, value 136,000 schilling; hose, 132 quintals, value 83,000 schilling, against 94 quintals, value 71,000 schilling; packing, 134 quintals, value 108,000 schilling, against 72 quintals, value 60,000 schil-

ling; and uncovered thread, 470 quintals, value 266,000 schilling, against 426 quintals, value 302,000 schilling. Footwear imports fell heavily from 356 quintals, value 205,000 schilling, to 133 quintals, value 102,000 schilling.

The favorable export balance was due to the increased shipments of rubber dough, 2,146 quintals, value 538,000 schilling, against 1,572 quintals, value 296,000 schilling; packing, 3,162 quintals, value 1,472,000 schilling, against 2,838 quintals, value 1,228,000 schilling; automobile tires, 1,404 quintals, value 575,000 schilling, against 946 quintals, value 446,000 schilling; rubberized fabrics, 858 quintals, value 291,000 schilling, against 710 quintals, value 239,000 schilling; elastic fabrics, 233 quintals, value 380,000 schilling, against 154 quintals, value 264,000 schilling; and toys, 966 quintals, value 562,000 schilling, against 827 quintals, value 562,000 schilling. The number of bathing caps exported increased again from 516,427 to 539,939, but the value declined from 429,000 to 423,000 schilling. Incidentally, England takes most of these bathing caps. On the other hand uncovered thread fell from 407 quintals, value 360,000 schilling, to 270 quintals, value 240,000 schilling; footwear was only 131 quintals, value 134,000 schilling, against 391 quintals, value 329,000 schilling. Tires, other than for automobiles, were 255 quintals, value 128,000 schilling, against 440 quintals, value 250,000 schilling. Hose and belting also showed declines.

EUROPEAN NOTES

The manufacture of pneumatic tires in Czechoslovakia is progressing rapidly, and as a logical outcome imports are dwindling while exports are growing. In 1929 record tire imports totaled 16,820,000 Czech kronen, in 1935 4,200,000; and the figures continue to decline. In the first half of 1936 automobile tire imports were valued at 1,150,000 kronen against 1,840,000 kronen in the corresponding period of 1935. Automobile tubes were 80,000 kronen, against 110,000 kronen. On the other hand imports of cycle tires and tubes increased, the former from 90,000 to 120,000 kronen, and the latter from 16,000 to 20,000 kronen. Totals for exports were several times higher than for the same period of 1935; automobile tire exports were 1,380,000 kronen against 520,000 kronen; automobile tubes, 180,000 kronen against 40,000 kronen; cycle tires, 120,000 against 40,000 kronen; and cycle tubes, 90,000 against 30,000 kronen.

It is barely 10 years since Poland first emerged as an important producer of rubber footwear, but in this short time its production soared to a value of 64,171,000 zloty in 1929 and dropped to 17,697,000 zloty in 1932, and its exports jumped to 11,516,000 zloty and fell to 713,000 zloty in 1935. After 1933 an improvement occurred: production rose somewhat and in 1934 came to 26,818,000 zloty; exports increased slightly from 6,417 to 6,514 quintals, but the value fell from 2,809,000 to 2,753,000 zloty. Then came the failure of the most important Polish rubber concern, the Pepege, and in 1935 exports dropped to the low level of 1,691 quintals, value 713,000 zloty. Besides footwear various other rubber goods are now being produced, and small amounts even exported. These include tires, surgical and sanitary goods, including latex goods, erasers, balls, belting, and thread. The exports of these were insignificant in 1934, but in 1935 practically ceased. Only thread, belting, and tires showed some increase, and tires only advanced in quantity, the value remaining stationary.

The well-known Pirelli concern of Italy for some time past has also been experimenting with the production of synthetic rubber. A special laboratory has been established at Milan for this purpose. It is claimed that tires and other articles have been made of synthetic rubber not inferior to those of the natural material.

Italy is said to be planning the immediate establishment of rubber plantations in Northern Africa.

France continues to improve the pneumatic-tired rail-cars known as Michelines. While the first Micheline, put into service in 1932, had a seating capacity of only 36 passengers, a new model has now been introduced with seats for 100 passengers; two of these cars can be coupled together to carry in all 272 persons, seated and standing. This latest Micheline is also capable of more than 80 miles an hour. France has now about 100 rail-cars on regular schedules covering over 300,000 miles monthly.

MIDWEST

(Continued from page 63)

mutual selling problems. Jobbers have always attended in large numbers to look over new products, learn about new merchandising and selling plans, and to confer with executives of the companies whose lines they distribute.

Globe-Union Mfg. Co., 900 E. Keefe Ave., Milwaukee, Wis., through President C. O. Wanvig announced on September 18 that at the last stockholders' meeting the corporate name was changed to Globe-Union, Inc. The stockholders also ratified a simplification of the corporate structure. This was necessitated through the growth and development of the company during the past few years and the fact that various operating companies in several states have been absorbed by the organization. Hereafter, all factories, Atlanta, Cincinnati, Dallas, Los Angeles, Memphis, Milwaukee, Philadelphia, and Seattle, and the various operating divisions including batteries, Centralab radio parts, spark plugs, and roller skates will be operated by the same executive control of Globe-Union, Inc., at Milwaukee.

Monsanto Chemical Co., St. Louis, Mo., according to Charles Belknap, executive vice president, will build a $2,000,000 phosphate plant at Columbia, Tenn.

Marbo Products Corp., 469 E. Ohio St., Chicago, Ill., has changed its name to Marbon Corp.

Sears, Roebuck & Co., Chicago, Ill., mail-order house, has given contracts to the following concerns to make the tires it will market the coming year: Dunlop Tire & Rubber Corp., Buffalo, N. Y.; Fisk Rubber Corp., Chicopee Falls, Mass.; and Armstrong Rubber Co., Inc., West Haven, Conn.

Kelsan Products recently moved plant and general offices to more commodious premises at 1015 S. Sixth St., St. Clair, Mich.

Paslode Co., manufacturer of carton sealers, recently moved to 2600 N. Western Ave., Chicago, Ill. K. R. Hoffmaster is new advertising manager.

New Incorporations

(Continued from page 61)

The International Play-Tex Co., Inc., Rochester, N. Y. Capital 200 shares, no par value. Hubbell, Goodwin, Mixon & Hargrave, Rochester. By-products of rubber and latex products.

MacEwan & Smith, Inc., Woodbridge, N. J. Capital 2,500 shares, no par value. J. A. MacEwan, Keyport; W. A. Austin, Elmora; and H. S. Smith, Roselle, all in N. J. Manufacture molded rubber goods.

The Tyson Corp., 17 Academy St., Newark, N. J. Capital 1,000 shares, no par value. T. H. Tyson, Railroad Pl., Woodbridge, N. J.; N. Davis and G. Buermann, both of 17 Academy St., Newark.

OHIO

(Continued from page 68)

large storehouse, thence to adjacent warehouses containing other materials. Schulman, however, was able to maintain uninterrupted service to its customers because of stocks available at its other Akron warehouse and one in E. St. Louis, Ill.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
*1,425	Rubber sundries ...	Montreal, Canada
†1,449	Rubber material for making imitation leather	Paris, Franee
†1,467	Tires	Caracas, Venezuela
†1,484	Rubber bathing suits	Lima, Peru
*1,499	Woven elastic fabric pressing machine ..	Salonica, Greece
*1,534	Household goods ...	Glasgow, Scotland
†1,542	Rubber goods	Cairo, Egypt
*1,553	Folding bathtubs, etc.	Bogota, Colombia
†1,555	Hair curlers	Lima, Peru
†1,562	Tires and tubes.....	Casablanca, Morocco
†1,567	Rubber shoes	Habana, Cuba

*Purchase. †Agency.

Rubber Industry in Far East

MALAYA

Japanese Competition

Under the heading "Japan Ueber Alles" ("Japan Over All") the *Straits Times* recently launched a vigorous attack on Japanese inroads in trade in Malaya. Within a very few years, it said, the whole of the local trade and banking will be dominated by Japanese. Energetically, but quietly, and in a perfectly legal manner, Japanese shippers traders, and bankers in Singapore have worked during the past 18 months to such purpose that the independent British trader is being forced out of business and British banking interests are faced with the prospect of playing second fiddle to their foreign rivals. It can be conclusively proved that under the existing free trade system in the Straits Settlements no one can compete with the Japanese, and early and drastic discriminatory action is imperative, says the paper.

How the Japanese have managed to obtain such a grip on local business is seen in the rubber trade. Japanese producers of rubber, buyers, brokers, shippers, firms which insure shipments, and bankers who finance the transactions are all connected and by their community of interests are able to spread costs so that they are in a position to quote as much as ⅜ to ½¢ per pound more for the purchase of rubber here and yet offer it for sale in New York at favorable price. As if this were not enough, Japanese steamers are subsidized by their government. British concerns, not having all these advantages, cannot compete, and the case is cited of a British firm, whose business is buying and shipping, but not carrying, of rubber from Malaya, which has not been able to ship a single pound of rubber this year, whereas it used to ship as much as 3,500 tons a month. Other firms are in more or less the same predicament.

It is estimated that 75% of the rubber trade between the East and New York is now in the hands of the Japanese. Not all of this is as yet carried in Japanese vessels, but unless some action is taken, it will not be long before this is the case. The Japanese Consul General protested that the facts are exaggerated and that only 40% of this trade is carried in Japanese bottoms. But two years ago only about 10% of the rubber sent to New York went in Japanese ships.

This article in the *Straits Times* has had the approval of leading European merchants, shippers, and bankers who fully agree as to the urgency of the situation. One large trading house is quoted as saying that if things continue as at present, there will not be another European trader in Singapore 10 years hence. The problem now is to find the right remedy, and here there is divergence of opinion; not every one feels that the free trade policy of the Straits Settlements must be abandoned, which seems the aim of the *Straits Times*.

Tire Imports

To illustrate what it means to Singapore's trade when "Governments all around us are giving assistance to their merchants and manufacturing industries, regardless of the effect of such action on their neighbors," the *Straits Times* in another article quotes figures showing the imports and reexports of automobile tires and tubes in 1934, 1935, and the first five months of 1936:

	1934	1935	Jan.-May 1936
COVERS			
Total	136,907	92,752	30,769
From United Kingdom	62,706	45,178	18,977
From Japan	13,408	14,763	3,688
From Netherland India	.....	203	1,384
Reexports	19,440	16,122	4,689
TUBES			
Total	90,688	50,271	14,903
From United Kingdom	69,983	41,068	11,065
From Japan	1,780	5,536	1,552
From Netherland India	.....	270	922
Reexports	15,390	11,809	3,710

Attention is called to the increasing shipments from Netherland India and to the falling reexports. It is further pointed out that there is at present in the Federated Malay States and the Unfederated Malay States a 20% duty on imported tires, with free preference to British manufacturers; but there is no duty on tires in the Straits Settlements.

Yields from Legitimate Seedlings

The first results of tapping pedigree seedlings produced by hand pollination between some of the best Pilmoor Estate clones, grown at the Experiment Station of the Rubber Research Institute of Malaya, are given by C. E. T. Mann in "Preliminary Results from the Study of Seedling Trees Derived from Proved Clones," also appearing in the institute's journal. In all 200 seedlings of known parentage were planted in April-June, 1929, and interplanted with them were illegitimate seedlings from the various clones used in making the crosses, and seedlings from ordinary estate trees. Test tapping was carried out in 1933 and 1934, and regular tapping was started January, 1935. The yields from the pedigree seedlings were found approximately equal to yields from budded trees of the same parent clones during the first tapping year. But the illegitimate seedlings consistently gave less than the buddings at comparable age, although those from A44 and B84 gave very promising yields. The output from the A44 illegitimate seedlings may be considered especially gratifying as the results were obtained from a comparatively much larger number of trees.

It is worth noting that though Clone A44 is the lowest yielding of the five principal clones used in this breeding work, its seedlings are among the best producers of the groups studied. Attention has already been called to the fine performance of the illegitimate seedlings of A44. However it appears that the budded trees of this clone are known to give high yields at a very early age, while the subsequent rate of increase is slow, so that its seedlings will have to be carefully studied. Buddings from Clone B16 gave the highest average output, 9.7 pounds of dry rubber per tree per annum. But three illegitimate seedlings from this clone gave the lowest output, 2.7 pounds of dry rubber per tree per annum.

Constitution of Latex

While a review of the literature on the chemistry of Hevea latex shows evidence of the presence in latex of no fewer than 60 different substances, very few of these have actually been isolated and definitely analyzed. Little is known of the mode of occurrence or chemical composition of even the better known non-caoutchouc constituents. This is all the more remarkable, points out K. C. Roberts, of the Rubber Research Institute of Malaya, in his article, "Constituents of Hevea Latex," in the June, 1936, issue of *Journal of the Rubber Research Institute of Malaya,* as some of these constituents are known to exert a profound influence on the preparation of plantation rubber.

Mr. Roberts describes a method for the isolation and the quantitative determination of the constituents of Hevea latex, including the caoutchouc hydrocarbon, in the form in which they occur in nature. He isolated three hitherto unknown constituents; the most interesting of these has provisionally been designated the "sulphur complex." Its existence either in latex or rubber has hitherto been unsuspected, though it is one of the major non-caoutchouc constituents. Different specimens of this material show wide variations as to quantity, color, and texture, but in general it is a cream-colored or

brown plastic material holding in combination a sulphur-containing acid. It was also found that the known major constituents, sugars, quebrachitol, phosphates, protein, fatty acids, exist in fresh latex chiefly as components of stable chemical complexes.

These interesting investigations will continue and should assist in throwing light on many questions of interest both to the producer and the consumer of rubber, such as the causes of variability, the constitution of clonal latices, the effect of ammoniation, besides many fundamental problems including the structure of the rubber hydrocarbon and the place of latex in the metabolism of the Hevea tree.

NETHERLAND INDIA

Native Rubber Exports

Data in the twenty-sixth and twenty-seventh reports on native rubber cultivation, covering the first and second quarters of 1936, respectively, show exports of native rubber during the first quarter were around 35,182 tons, or 1,653 tons below the permissible quota, but shipments in the second quarter at 38,358 tons showed an excess of 1,564 tons. In the end the total for the six months was 83 tons below permissible. This satisfactory state of affairs was only achieved because the various districts already under individual restriction shipped 1,300 tons short, or 8,792 tons out of a permissible 10,092 tons.

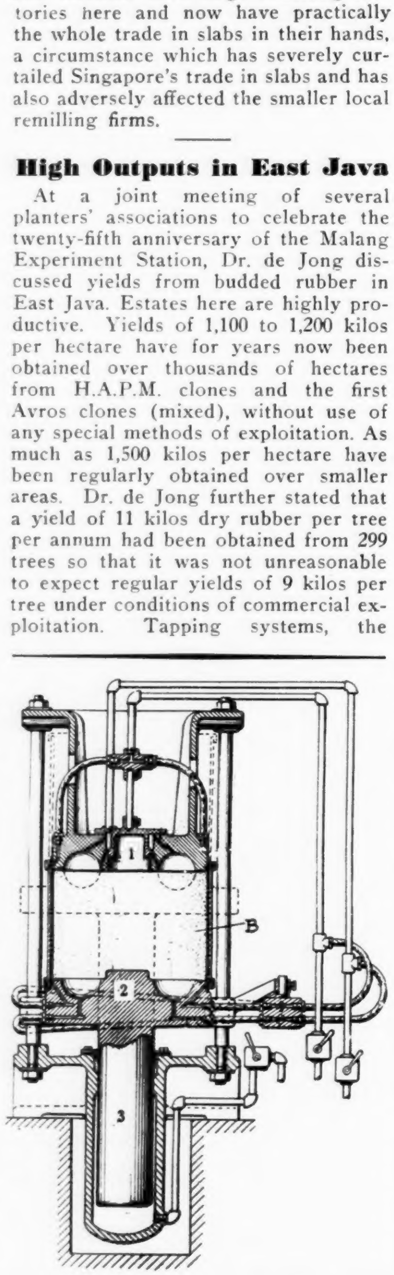
The amount of dry rubber exported continues to increase although the proportion in the first quarter of 1936 fell to 80% from 85% in the preceding quarter. In the second quarter of 1936, however, the percentage went up to 81.7 and will no doubt continue to gain as the natives of the more backward districts take more and more to drying and smoking their rubber. It is remarkable what progress has already been made in this direction, partly due to the special export duty, which has stimulated the preparation of drier rubber, partly to the enforcement of special regulations regarding quality, and, of course, to propaganda.

For instance, Djambi, formerly notorious for the bad quality of the rubber sent out, in the first half of 1936 shipped 97% of its rubber in the form of blankets and sheets. An increasing number of smokehouses is being established, some of them fairly large; already smoked sheet constitutes 50% of the total sheet exports, and the proportion is growing. Of the total 11,050 tons shipped, 7,668 tons were sheets, 3,094 tons blankets, and only 288 tons were slabs. Another improvement is the use of acetic acid as a coagulant instead of alum. Progress in Palembang, which shipped about the same amount, is much slower; it still exports about 60% of its rubber in the form of slabs; while the proportion of sheet is almost negligible. However here, too, smokehouses are beginning to crop up so that further improvement may be looked for.

West Borneo and South East Borneo between them account for almost half the total native shipments. The former sends all its rubber in blankets and sheets, and the latter well over 90%. In South East Borneo the preparation of smoked sheet is increasing, and several big shippers are taking a keen interest in this product. In this district now are five important buyers for native smoked sheet, Nomura, Lee Rubber, Maclain Watson, Borsumji, and Internatio. Incidentally, Lee Rubber and Nomura have large remilling factories here and now have practically the whole trade in slabs in their hands, a circumstance which has severely curtailed Singapore's trade in slabs and has also adversely affected the smaller local remilling firms.

High Outputs in East Java

At a joint meeting of several planters' associations to celebrate the twenty-fifth anniversary of the Malang Experiment Station, Dr. de Jong discussed yields from budded rubber in East Java. Estates here are highly productive. Yields of 1,100 to 1,200 kilos per hectare have for years now been obtained over thousands of hectares from H.A.P.M. clones and the first Avros clones (mixed), without use of any special methods of exploitation. As much as 1,500 kilos per hectare have been regularly obtained over smaller areas. Dr. de Jong further stated that a yield of 11 kilos dry rubber per tree per annum had been obtained from 299 trees so that it was not unreasonable to expect regular yields of 9 kilos per tree under conditions of commercial exploitation. Tapping systems, the speaker claimed, had become increasingly mild, but to obtain 1,500 kilos per hectare and over a more intensive system and deep tapping were necessary. Moreover it was important to plant and to maintain the right number of trees throughout the life of the plantation.



Device to Form Inner Tubes

Whitford in the East

H. N. Whitford, rubber expert of one of the largest rubber concerns in the United States, recently revisited Netherland India. He spent some time in Sumatra and after stopping over at Batavia proceeded to Borneo where he will also study the local rubber industry.

FAR EAST NOTES

According to the *Japan Chronicle*, several important Japanese concerns have formed a company with a capital of 5,000,000 yen to acquire interests in various rubber estates in Siam. Among the promoters of the new enterprise are named the South Seas Growers Association and the Nissan Rubber Co.

Crude rubber exports from Ceylon during the first half of 1936 came to 49,191,644 pounds against 55,225,795 pounds in the corresponding period of 1935.

Under a series of rulings by the Australian customs authorities the following articles have been excluded from the import license requirements: elastic webbing and apparel elastic, carbon black, and overcoats, according to reports from Assistant Trade Commissioner Wilson C. Flake, Sydney.

D. Chisholm Cameron, secretary, Hardie Rubber Co., Ltd., Sydney, Australia, is spending a few weeks in the United States in the interests of his company. Mr. Cameron left his home early in March and meanwhile has visited England and the principal countries of Continental Europe. The Hardie company is engaged in the production of waterproof clothing and mechanical goods including printers' and tanners' rolls. The company has about 400 employes.

Inner Tube Former

(*Continued from page 58*)

The upper half die is fixed; while the lower half is attached to the top of a hydraulic ram 3.

The application of vacuum to the mold cavities of the dies causes the wall portion of the rubber blank *B* between the gripped ends to be drawn inward away from the mandrel and finally to conform to the blank cavity contours as indicated by the dotted lines in the drawing. What were the end edges of the rubber blank are brought together and united in a seam on the outer circumference of the tube, and the excess material is cut off.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	July 25	Aug. 29	Sept. 5	Sept. 12	Sept. 19
Sept.	16.32	16.22	16.25	16.31	16.48
Oct.	.....	16.29	16.28	16.35	16.48
Dec.	16.42	16.41	16.44	16.46	16.58
Mar.	16.52	16.52	16.53	16.55	16.69
July	.....	16.71	16.70	16.73	16.85
Volume per week (tons)	4,000	6,140	4,690	2,330	5,260

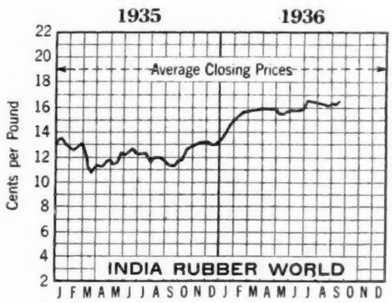
THE above tabulation shows prices of representative future contracts on the New York market during approximately the past two months.

The first three weeks of September the market trading averaged light with the trend slowly upward. Spot ribbed smoked sheets advanced from 16¼¢ September 1 to 16 7/16¢ September 26. Factories kept almost completely disinterested, and little shipment business was done. Improvement was noted particularly during the third week of September with the monthly report of statistics by the R. M. A., stating that United States rubber consumption for August was reported 20.3% larger than during August, 1935, and only slightly below July, 1936, consumption. During the first eight months of 1936 the United States consumed 15% more rubber than during last year, and it is estimated that the domestic consumption for the current year will total 550,000 tons.

The following news item and opinion appeared in *The Journal of Commerce* (N. Y.) of September 21:

"The International Rubber Regulation Committee will meet September 29. The recent action of the rubber markets seems to indicate that no increase in the export quota is expected for the final quarter of this year. However, no substantial increase in factory buying seems likely before this uncertainty will be definitely settled. It is quite possible that the international committee will announce its quota decision for the first quarter of next year at the coming meeting and an increase for that period appears definitely possible."

New York Outside Market on next page



New York Outside Market—Spot Ribbed Smoked Sheets

New York Quotations

New York outside market rubber quotations in cents per pound

	Sept. 26, 1935	Aug. 27, 1936	Sept. 26, 1936
Paras			
Upriver fine	10½	20½	21
Upriver fine	*12½	*25	*25¼
Upriver coarse	7¼	11¾	12
Upriver coarse	*11½	*17	*17
Islands fine	11½	21	20
Islands fine	*12½	*25½	*24
Acre, Bolivian fine	10¾	21	21¼
Acre, Bolivian fine	*12⅝	*25½	*25½
Beni, Bolivian	11	21	21½
Madeira fine	10½	20½	21
Caucho			
Upper ball	7¼	11¾	12
Upper ball	*11½	*17	*17
Lower ball	7	11½	11¾
Pontianak			
Bandjermasin	7	6	7
Pressed block	11½	9/20	10/21
Sarawak	7	6	7
Guayule			
Duro, washed and dried	12	13¼	13¼
Ampar	13	13¾	13¾
Africans			
Rio Nuñez	12	14¾	15
Black Kassai	10	15	15¼
Prime Niger flake	25	27	27½
Gutta Percha			
Gutta Siak	12	10¼	10¼
Gutta Soh	14	15	13½
Red Macassar	1.25	1.00	1.00
Balata			
Block, Ciudad Bolivar	32	30	30
Manaos block	27	27	27
Surinam sheets	30	33	32
Amber	35	37	37

*Washed and dried crepe. Shipments from Brazil.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	Aug. 24	Aug. 25	Aug. 26	Aug. 27	Aug. 28	Aug. 29*	Aug. 31	Sept. 1	Sept. 2	Sept. 3	Sept. 4	Sept. 5*	Sept. 7†	Sept. 8	Sept. 9	Sept. 10*	Sept. 11	Sept. 12*	Sept. 14	Sept. 15	Sept. 16	Sept. 17	Sept. 18	Sept. 19*
No. 1 Ribbed Smoked Sheet	16⅛	16⅛	16¼	16¼	16¼	..	16 5/16	16 7/16	16 7/16	16⅜	16 5/16	..	..	16 5/16	16¼	..	16⅜	..	16 7/16	16½	16 9/16	16 9/16	16 9/16	..
No. 2 Ribbed Smoked Sheet	16 1/16	16 1/16	16 3/16	16 3/16	16 3/16	..	16¼	16⅜	16⅜	16 5/16	16¼	..	..	16¼	16 3/16	..	16 5/16	..	16⅜	16 7/16	16½	16½	16½	..
No. 3 Ribbed Smoked Sheet	16	16	16⅛	16⅛	16⅛	..	16 3/16	16 5/16	16 5/16	16¼	16 3/16	..	..	16 3/16	16⅛	..	16¼	..	16 5/16	16⅜	16 7/16	16 7/16	16 7/16	..
No. 4 Ribbed Smoked Sheet	16	16	16⅛	16⅛	16⅛	..	16 3/16	16 5/16	16 5/16	16¼	16 3/16	..	..	16 3/16	16⅛	..	16¼	..	16 5/16	16⅜	16 7/16	16 7/16	16 7/16	..
No. 1 Thin Latex Crepe	16 11/16	16 11/16	16 13/16	16 13/16	16 13/16	..	16 15/16	17 1/16	17 1/16	17	16 15/16	..	..	16 15/16	16⅞	..	17	..	17 1/16	17⅛	17 3/16	17 3/16	17 3/16	..
No. 1 Thick Latex Crepe	16¾	16¾	16⅞	16⅞	16⅞	..	16 15/16	17 1/16	17 1/16	17	16 15/16	..	..	16 15/16	16⅞	..	17	..	17 1/16	17⅛	17 3/16	17 3/16	17 3/16	..
No. 1 Brown Crepe	16 1/16	16 1/16	16 3/16	16 3/16	16 3/16	..	16¼	16⅜	16⅜	16 5/16	16¼	..	..	16¼	16 3/16	..	16 5/16	..	16⅜	16 7/16	16½	16½	16½	..
No. 2 Brown Crepe	16	16	16⅛	16⅛	16⅛	..	16 3/16	16 5/16	16 5/16	16¼	16 3/16	..	..	16 3/16	16⅛	..	16¼	..	16 5/16	16⅜	16 7/16	16 7/16	16 7/16	..
No. 2 Amber	16 1/16	16 1/16	16 3/16	16 3/16	16 3/16	..	16¼	16⅜	16⅜	16 5/16	16¼	..	..	16¼	16 3/16	..	16 5/16	..	16⅜	16 7/16	16½	16½	16½	..
No. 3 Amber	16	16	16⅛	16⅛	16⅛	..	16 3/16	16 5/16	16 5/16	16¼	16 3/16	..	..	16 3/16	16⅛	..	16¼	..	16 5/16	16⅜	16 7/16	16 7/16	16 7/16	..
No. 4 Amber	15⅞	15⅞	16	16	16	..	16 1/16	16 3/16	16 3/16	16⅛	16 1/16	..	..	16 1/16	16	..	16⅛	..	16 3/16	16¼	16 5/16	16 5/16	16 5/16	..
Rolled Brown	15⅝	15⅝	15¾	15¾	15¾	..	15 13/16	15 15/16	15 15/16	15⅞	15 13/16	..	..	15 13/16	15¾	..	15⅞	..	15 15/16	16	16 1/16	16 1/16	16 1/16	..

* Closed. † Holiday.

New York Outside Market (Continued)

	Sept. 21	Sept. 22	Sept. 23	Sept. 24	Sept. 25	Sept. 26*
No. 1 Ribbed Smoked Sheet	16⅝	16⅝	16½	16 7/16	16 7/16	..
No. 2 Ribbed Smoked Sheet	16 9/16	16 9/16	16 7/16	16⅜	16⅜	..
No. 3 Ribbed Smoked Sheet	16½	16½	16⅜	16 5/16	16 5/16	..
No. 4 Ribbed Smoked Sheet	16½	16½	16⅜	16 5/16	16 5/16	..
No. 1 Thin Latex Crepe	17¼	17¼	17⅛	17 1/16	17 1/16	..
No. 1 Thick Latex Crepe	17¼	17¼	17⅛	17 1/16	17 1/16	..
No. 1 Brown Crepe	16 9/16	16 9/16	16 7/16	16⅜	16⅜	..
No. 2 Brown Crepe	16½	16½	16⅜	16 5/16	16 5/16	..
No. 2 Amber	16 9/16	16 9/16	16 7/16	16⅜	16⅜	..
No. 3 Amber	16½	16½	16⅜	16 5/16	16 5/16	..
No. 4 Amber	16⅜	16⅜	16¼	16 3/16	16 3/16	..
Rolled Brown	16⅛	16⅛	16	15 15/16	15 15/16	..

*Closed.

Argentine Rubber Imports

	First Six Months 1935 (Pounds)	First Six Months 1936 (Pounds)
United States	2,686,750	1,247,620
United Kingdom	637,530	1,088,340
British Malaya	1,620,300	1,952,500
Ceylon	718,520	625,350
Germany	18,150	14,740
Others	303,710	123,310
Total	5,984,960	5,051,860

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.— Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net) Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1933	411,615	401,079	365,000	55,606	86,505	44,884	853,500	801,500	616,370
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,019,200	964,500	681,362
1935	448,116	491,544	303,000	39,094	164,295	28,304	872,722	931,278	586,282
1936									
January ...	31,292	48,506	285,054	43,870	162,107	31,195	62,720	66,138	566,852
February ..	35,219	36,746	282,902	46,532	157,028	38,421	64,019	59,512	569,550
March	37,451	42,703	276,823	58,935	147,712	29,322	69,213	61,478	548,721
April	40,365	51,897	264,228	47,678	140,404	32,200	60,029	70,763	524,655
May	35,600	50,482	248,317	48,860	130,590	26,687	68,837	64,908	499,116
June	41,802	52,636	245,886	47,228	122,285	28,260	66,478	64,381	490,933
July	35,847	48,127	234,498	60,343	113,386	29,443	83,856	.....	488,023
August ...	42,563	46,657	229,056	63,597	......	......	......	......	......

* Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat.

CRUDE rubber consumption by United States manufacturers for August, 1936, is estimated at 46,657 long tons, against 48,127 long tons for July, approximately 3.1% under July, but 20.3% above the August, 1935, revised figure of 38,775 long tons, according to R.M.A. statistics.

Crude rubber imports for August totaled 42,563 long tons, 18.7% over the July figure of 35,847 long tons and 10.1% over the 38,655 long tons imported in August, 1935.

The estimated total domestic stocks of crude rubber on hand August 31 were 229,056 long tons, compared with July 31 stocks of 234,498 long tons and 334,106 (revised) long tons on hand August 31, 1935.

Crude rubber afloat to United States ports on August 31 is estimated at 63,597 long tons, against 60,343 long tons afloat on July 31 and 47,724 long tons afloat on August 31, 1935.

London and Liverpool Stocks

Week Ended	London (Tons)	Liverpool (Tons)
Aug. 29............	45,521	62,545
Sept. 5............	46,172	61,921
Sept. 12............	45,249	61,030
Sept. 19............	43,965	60,362
Sept. 26............	43,993	59,791

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % to Crude	U. S. Stocks*	Exports
1934	110,010	100,597	22.3	23,079	4,737
1935	122,140	113,530	22.9	25,069	5,383
1936					
January	11,665	10,039	20.7	26,145	572
February	10,188	7,366	20.0	28,267	455
March	10,712	8,767	20.5	29,161	591
April	11,382	10,333	19.9	22,274	589
May	11,512	10,396	20.6	22,852	635
June	11,935	11,548	21.9	22,738	596
July	12,330	11,816	24.6	22,602	633
August	12,856	10,993	23.6	23,750	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

PRODUCTION of reclaimed rubber for August was 526 tons above that for July; consumption was 823 tons less in August than in July. August stocks advanced 1,148 tons over those of July.

The outlook for fall business, however, is considered favorable, particularly in automobile accessories, wire insulation, battery boxes, and mechanical goods lines.

Quotations on all grades are unchanged from last month.

New York Quotations

September 26, 1936

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	5 / 5¼
Acid	1.18-1.22	6 / 6¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tube		
No. 1 Floating	1.00	14 /14¼
Compounded	1.10-1.12	7¼/ 7½
Red Tube	1.15-1.30	7¼/ 7¾
Miscellaneous		
Mechanical Blends....	1.25-1.50	3½/ 4¼
White	1.35-1.50	9¼/10¼

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

New York Outside Market

Prices in the outside market for spot ribbed smoked sheets ranged from $16\frac{5}{16}$¢ to $16\frac{7}{16}$¢ during the first week of September with little buying interest manifest on the part of consumers. More or less increase of factory buying became evident during the succeeding two weeks when spot advanced to $16\frac{9}{16}$¢ on the nineteenth, declining to $16\frac{7}{16}$¢ on the twenty-sixth. Buying did not at any time exceed very moderate proportions pending appearance of the regular monthly R. M. A. statistical data. There was also further inclination to delay purchases until after learning the new decision on export quotas by the International Rubber Regulation Committee.

Week-end closing prices on No. 1 ribbed smoked sheets follow: July 25, 16⅜; August 15, $16\frac{5}{16}$; August 29, 16¼; September 5, $16\frac{5}{16}$; September 12, 16⅜; September 19, $16\frac{9}{16}$; September 26, $16\frac{7}{16}$.

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RUBBER SCRAP

THE demand for scrap the past month was well sustained. Boots and shoes are improving in sales over a month ago at prices unchanged; while the demand for all grades of tubes continues at last month's schedule of prices. Pneumatic tire scrap grades also continue at the same levels quoted in August, with demand somewhat improved. Prices on both grades of solid tire stock are firm and unchanged. The demand is moderate and spotty. Mechanicals are all unchanged and in fair demand.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

September 26, 1936

		Prices
Boots and Shoes		
Boots and shoes, black.....	*lb.*	$0.01 /$0.01⅛
Colored	*lb.*	.00¾/ .00⅞
Untrimmed arctics	*lb.*	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	*lb.*	.11 / .11½
No. 2, compound	*lb.*	.04¼/ .04⅜
Red	*lb.*	.04¼/ .04⅜
Mixed tubes	*lb.*	.04⅛/ .04¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	9.25 / 9.50
Beadless	*ton*	13.00 /13.50
Auto tire carcass........	*ton*	16.00 /17.00
Black auto peelings.....	*ton*	15.00 /16.00
Solid		
Clean mixed truck......	*ton*	31.50 /33.00
Light gravity	*ton*	36.00 /37.00
Mechanicals		
Mixed black scrap	*ton*	14.50 /15.00
Hose, air brake	*ton*	18.00 /20.00
Garden, rubber covered..	*ton*	14.00 /15.00
Steam and water, soft...	*ton*	14.00 /15.00
No. 1 red	*lb.*	.03 / .03¼
No. 2 red	*lb.*	02¾/ .03
White druggists' sundries..	*lb.*	.04½/ .05
Mechanical	*lb.*	.03¾/ .04
Hard Rubber		
No. 1 hard rubber.........	*lb.*	.12 / .12½

COMPOUNDING INGREDIENTS

CARBON BLACK. Third-quarter sales proved very good because tire production has been well maintained compared with normal for that period of the year. Carbon black production has increased in line with consumption. Should tire production be reduced this fall, stocks of carbon black will doubtless be increased to a normal basis. The market has been quite stable, and the only item that may give rise to any change is the idea expressed in Texas that additional taxes may become necessary when the next session of the legislature occurs.

FACTICE OR RUBBER SUBSTITUTE. These ingredients are in good demand. Prices are firm and somewhat higher owing to the increased prices for vegetable oils.

LITHARGE. The demand is improving, with no change in price.

LITHOPONE. Demand rules fair, with price unchanged.

RUBBER CHEMICALS AND COLORS. Although a seasonal drop in demand was expected in August, it did not materialize. The volume of business in rubber chemicals is holding up exceptionally well, and the prospects for later fall business appear unusually good. No changes in price are contemplated for the last quarter of the year.

RUBBER SOLVENTS. The fair demand in August assumed greater activity in September; while the price continued steady and unchanged.

STEARIC ACID. Steadily improving demand is noted for stearic acid, which advanced ½¢ a pound on all grades about mid-September because of the increased cost of pressing.

TITANIUM PIGMENTS. The good demand in August has since improved in activity. Prices hold to schedule unchanged. A new barium compound with 30% titanium dioxide content is now available.[1]

ZINC OXIDE. The announcement of an advance effective October 1 due to the rise in zinc metal stimulated demand.

[1] See p. 39.

New York Quotations

September 26, 1936

Prices Not Reported Will Be Supplied on Application

Abrasives

Pumicestone, powdered	lb.	$0.02½/$0.03½
Rottenstone, domestic	lb.	.03 / .03½
Silica, 15	ton	38.00

Accelerators, Inorganic

Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.07

Accelerators, Organic

A-1	lb.	.24 / .28
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	.46 / .55
Accelerator 49	lb.	
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	
D.O.T.T.U.	lb.	
DPG	lb.	
El-Sixty	lb.	.55 / .65
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.11¾
Witco	lb.	.11
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
O. N. V.	lb.	
Ovac	lb.	
Pipsolene	lb.	1.60 / 1.85
R-2	lb.	1.50 / 1.80
Base	lb.	3.30 / 3.75
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	.62 / 1.00
Blend B	lb.	.62 / .75
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	$0.48 /$0.60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	
ZML	lb.	

Activator

Barak	lb.	

Age Resisters

AgeRite Alba	lb.	
Excel	lb.	
Gel	lb.	
Hipar	lb.	
HP	lb.	
Powder	lb.	
Resin	lb.	
D	lb.	
Syrup	lb.	
White	lb.	
Akroflex C	lb.	
Albasan	lb.	
Antox	lb.	
B-L-E	lb.	
B-X-A	lb.	
Copper Inhibitor X-872	lb.	
Flectol B	lb.	.54 / .65
H	lb.	.54 / .65
White	lb.	.95 / 1.15
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	.66 / .75
Parazone	lb.	
Perflectol	lb.	.67 / .75
Permalux	lb.	
Solux	lb.	
Thermoflex	lb.	
A	lb.	
V-G-B	lb.	

Alkalies

Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	3.00 / 4.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60 / 3.60

Antiscorch Materials

Antiscorch T	lb.	
Cumar RH	lb.	.09
Retarder B	lb.	
W	lb.	
T-J-B	lb.	
U.T.B.	lb.	

Antisun Materials

Heliozone	lb.	
Sunproof	lb.	

Brake Lining Saturant

B. R. T. No. 3	lb.	.016 / .018

Colors

BLACK

Lampblack (commercial)	lb.	.15

BLUE

Brilliant	lb.	
Prussian	lb.	
Toners	lb.	.80 / 3.50

BROWN

Mapico	lb.	$0.13

GREEN

Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	
oxide	lb.	.18½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 /$3.50

ORANGE

Lake	lb.	
Toners	lb.	.40 / 1.60

ORCHID

Toners	lb.	1.50 / 2.00

PINK

Toners	lb.	1.50 / 4.00

PURPLE

Permanent	lb.	
Toners	lb.	.60 / 2.00

RED

Antimony		
Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48
Golden 15/17%	lb.	
7-A	lb.	.33
Z-2	lb.	.22
Aristi	lb.	
Cadmium, light (400 lb. bbls.)	lb.	.70
Chinese	lb.	
Crimson	lb.	
Mapico	lb.	
Medium	lb.	
Rub-Er-Red	lb.	.09¼
Scarlet	lb.	
Toners	lb.	.80 / 2.00

WHITE

Lithopone (bags)	lb.	.04½/ .04¾
Albalith Black Label-11	lb.	.04½/ .04¾
Astrolith (5-ton lots)	lb.	.04½
Azolith	lb.	.04½/ .04¾
Cryptone-19	lb.	.06 / .06¼
CB-21	lb.	.06 / .06¼
ZS No. 20	lb.	.10½/ .10¾
No. 86	lb.	.10½/ .10¾
Sunolith (5-ton lots)	lb.	.04½
Ray-Bar	lb.	
Ray-Cal	lb.	
Rayox	lb.	
Titanolith (5-ton lots)	lb.	.06
Titanox-A (50-lb. bags)	lb.	.17 / .18½
B (50-lb. bags)	lb.	.06 / .06¼
B-30 (50-lb. bags)	lb.	
C (50-lb. bags)	lb.	.06 / .06¼
Ti-Tone	lb.	
Zinc Oxide		
Anaconda, Green Seal No. 333	lb.	.06¼/ .06½
Lead Free No. 352	lb.	.05¼/ .05½
No. 570	lb.	.05¼/ .05½
No. 577	lb.	.05¼/ .05½
Red Seal No 222	lb.	.05¾/ .06
U.S.P. No. 777 (bbls.)	lb.	.08
White Seal No. 555	lb.	.06¾/ .07

Azo ZZZ-11 ....lb. $0.05¼/$0.05½
44 ....lb. .05¼/ .05½
55 ....lb. .05¼/ .05½
66 ....lb. .05¼/ .05½
French Process, Florence White Seal-7 (bbls.) .lb. .06¾/ .07
Green Seal-8 ....lb. .06¼/ .06½
Red Seal-9 ....lb. .05¾/ .06
Kadox, Black Label-15..lb. .05¼/ .05½
Blue Label-16............lb. .05¼/ .05½
Red Label-17 ....lb. .05¼/ .05½
Horse Head Special 3....lb. .05¼/ .05½
XX Red-4 ....lb. .05¼/ .05½
23 ....lb. .05¼/ .05½
72 ....lb. .05¼/ .05½
78 ....lb. .05¼/ .05½
80 ....lb. .05¼/ .05½
103 ....lb. .05¼/ .05½
110 ....lb. .05¼/ .05½
St. Joe (lead free)
Black Label No. 20....lb. .05¼/ .05½
Green Label No. 42....lb. .05¼/ .05½
Red Label No. 30......lb. .05¼/ .05½
U.S.P. X............lb. .08 / .08¼
White Jack ....lb. .10⅛/ .11⅛

YELLOW
Cadmolith (cadmium yellow), 400-lb. bbls. ....lb. .45
Lemon ....lb.
Mapico ....lb. .09⅛
Toners ....lb. 2.50

Dispersing Agents
Bardol ....lb. .021 / .023
Darvan ....lb.

Factice
Amberex ....lb. .26
Brown ....lb. .08 / .13
Duphax A............lb. .12
B ....lb. .12
Fac-Cel B ....lb. .145
C ....lb. .145
White ....lb. .09 / .14

Fillers, Inert
Asbestine, c.l., f.o.b. mills.ton 15.00
Barytes ....ton 30.00
f.o.b. St. Louis (50 lb. paper bags).......ton 22.85
off color, domestic......ton 20.00 /25.00
white, imported ......ton 29.00 /32.00
Blanc fixe, dry, precip.....lb. .03½/ .05
Calcene ....ton 37.50 /45.00
Infusorial earth ....lb. .02 / .03
Kalite No. 1............ton
No. 3 ....ton
Magnesia, calcined, heavy..lb. .04
carbonate ....lb. .06½/ .07
Whiting
Columbia Filler ....ton 9.00 /14.00
Domestic ....100 lbs.
Guilders ....100 lbs.
Hakuenka ....lb.
Paris white, English cliffstone ....100 lbs.
Southwark Brand, Commercial ....100 lbs.
All other grades..100 lbs.
Suprex, white extra light.ton 45.40 /60.00
heavy ....ton 45.40 /60.00
Witco, c.l. ....ton 7.00

Fillers for Pliability
P-33 ....lb.
Thermax ....lb.
Velvetex ....lb. .03 / .04½

Finishes
IVCO lacquer, clear......gal.
colors ....gal.
Rubber lacquer, clear.....gal.
colored ....gal.
Starch, corn, pwd.......100 lbs.
potato ....lb.
Talc ....ton 25.00 /45.00
Pyrax ....ton

Flock
Cotton flock, dark ....lb. .11½/ .14
dyed ....lb. .50
white ....lb. .14½/ .20
Rayon flock, colored.......lb. 1.25 / 1.60
white ....lb. 1.10

Latex Compounding Ingredients
Accelerator 85 ....lb.
89 ....lb.
122 ....lb.
552 ....lb.
Alphasol-OS ....lb.
Antox, Dispersed ....lb.
Aquarex A ....lb.
D ....lb.
F ....lb.
Aresklene 375 ....lb. .35 / .50
Black No. 25, Dispersed....lb. .22 / .40
Catalpo ....ton
Color Pastes, Dispersed....lb.
Dispersex No. 15............lb. .80 / .95
No. 20 ....lb. .60 / .75
Emo, brown ....lb. .13
white ....lb. .13
Factice Compound, Dispersed ....lb. .30
Heliozone, Dispersed ......lb.
Igepon A. ....lb.
MICRONEX, Colloidal .08 / .11
320 lbs. ....lb. $0.08
Nekal BX (dry) ....lb.
Palmol ....lb. .10
Paradors ....lb.
Stablex A ....lb. 1.75
B ....lb. .90
C ....lb. .30
Sulphur, Dispersed ....lb. .10 /$0.15
T.1. (400 lb. drums)......lb. .40
Tepidone ....lb.
Vulcan Colors ....lb.
Zinc oxide, Colloidal ......lb.
Dispersed ....lb. .09 / .15

Mineral Rubber
B. R. C. No. 20............lb. .0125/ .014
Black Diamond ....ton 25.00
Genasco Hydrocarbon, granulated, (fact'y)...ton
solid ....ton
Gilsonite Hydrocarbon (factory) ....ton
Hydrocarbon, hard ....ton
soft ....ton
Parmr Grade 1............ton 25.00
Grade 2 ....ton 31.00
Pioneer ....ton
265° ....ton

Mold Lubricants
Mold Paste ....lb. .12 / .30
Sericite ....ton 65.00 /75.00
Soapbark ....lb.
Soapstone ....ton 25.00 /35.00

Oil Resistant
AXF ....lb.

Reclaiming Oils
B. R. V............lb. .039 / .041
S. R. O. ....lb. .015 / .019

Reenforcers
Carbon Black
Aerfloted Arrow Specification Black ....lb. .0535/ .0825
Arrow Compact Granulized Carbon Black ....lb.
"Certified" Heavy Compressed, Cabot ....lb.
Spheron ....lb.
Disperso (delivered) ....lb. .0445/ .0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ...lb. .0445
c.l., delivered New York.lb. .0535
local stock delivered...lb. .07 / .08¼
Dixiedensed, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ...lb. .0445
c.l., delivered New York.lb. .0535
local stock delivered...lb. .07 / .08¼
Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445
c.l., delivered New York.lb. .0535
local stock delivered....lb. .07 / .08¼
Excello, c.l., f.o.b. Gulf ports ....lb. .0445/ .0645
delivered New York.lb. .0535/ .0735
l.c.l., delivered New York ....lb. .07 / .08¼
Fumonex, c.l., f.o.b. works.lb. .03
ex-warehouse ....lb. .04½
Gastex ....lb. .03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ...lb. .0445
c.l., delivered New York.lb. .0535
local stock delivered...lb. .07 / .08¼
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445
c.l., delivered New York.lb. .0535
local stock, delivered...lb. .07 / .08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ...lb. .0445
c.l., delivered New York.lb. .0535
local stock delivered...lb. .07 / .08¼
MICRONEX Beads, c.l., f.o.b. Gulf ports...lb. .0445
c.l., delivered New York ....lb. .0535
local stock, l.c.l., delivered ....lb. .07 / .08¼
Mark II, c.l., f.o.b. Gulf ports ....lb. .0445
c.l., delivered New York ....lb. .0535
local stock, l.c.l., delivered ....lb. .07 / .08¼
Standard, c.l., f.o.b. Gulf ports ....lb. .0445
c.l., delivered New York ....lb. .0535
local stock, l.c.l., delivered ....lb. .07 / .08¼
W-5, c.l., f.o.b., Gulf ports ....lb. .0445
c.l., delivered New York ....lb. $0.0535
local stock, l.c.l., delivered ....lb. .07 /$0.08¼
W-6, c.l., f.o.b., Gulf ports ....lb. .0445
c.l., delivered New York ....lb. .0535
local stock, l.c.l., delivered ....lb. .07 / .08¼
Pelletex ....lb. .03 / .07
Supreme, c.l., f.o.b. Gulf ports ....lb. .0445/ .0645
delivered New York.lb. .0535/ .0735
l.c.l., delivered New York ....lb. .07 / .08¼
"WYEX BLACK" ......lb.
Carbonex ....lb. .03 / .0375
Carbonex "S" ....lb. .0315/ .04
Clays
Aerfloted Paragon ......ton 8.50
Suprex No. 1 Selected.ton 10.00
No. 2 Standard.....ton 8.50
China ....ton
Dixie ....ton
Junior ....ton
McNamee ....ton
Par ....ton
Witco ....ton 8.50
Cumar EX ....lb. .04

Reodorants
Amora A ....lb.
B ....lb.
C ....lb.
D ....lb.
Paradors ....lb.
Rodo No. 0............lb.
No. 10 ....lb.

Rubber Substitutes
Black ....lb. .07 / .11
Brown ....lb. .08 / .14
White ....lb. .08½/ .14

Softeners
Burgundy pitch ....lb. .05
Cycline oil ....gal. .15 / .28
Palm oil (Witco)............lb. .05½
Petrolatum, amber (f.o.b. refinery, Warren, Pa.)...lb. .02½/ .03¼
light amber ....lb. .02¾/ .03½
Pine tar ....gal.
Plastogen ....lb.
Reogen ....lb.
Rosin oil, compounded....gal. .40
RPA No. 1............lb.
Rubtack ....lb. .10
Tackol ....lb. .085 / .18
Tonox ....lb.
Powder ....lb.
Witco No. 20 ....gal. .15

Softeners for Hard Rubber Compounding
RSL Resin ....lb. .25 / .35
Resin C Pitch 55° C. M.P. ..lb. .0125/ .0145
Resin C Pitch 70° C. M.P. ..lb. .0125/ .0145
Resin C Pitch 85° C. M.P. ..lb. .0125/ .0145

Solvents
Beta-Trichlorethane ......gal.
Bondogen ....lb.
Carbon bisulphide ....lb.
tetrachloride ....lb.

Stabilizers for Cure
Laurex, ton lots ....lb.
Stearex B ....lb. .09¼/ .10½
Beads ....lb. .093 / .101
Stearic acid, single pressed.lb. .09½/ .10½
Stearite ....100 lbs. 9.30 /10.10
Zinc stearate ....lb. .22

Synthetic Rubber
"DuPrene"[1] Latex Type 50.lb.
53 ....lb.
54 ....lb.
Type E ....lb.
"Thiokol" A (f.o.b. Yardville) ....lb. .35
Coating Materials ......gal. 3.00 / 5.00
D ....lb. .65
Molding Powder ....lb. .55 / .70

Tackifier
B. R. H. No. 2............lb. .014 / .02

Varnish
Shoe ....gal. 1.45

Vulcanizing Ingredients
Sulphur
Chloride, drums ....lb. .03½/ .04
Rubber ....100 lbs.
Telloy ....lb.
Vandex ....lb.
(See also Colors—Antimony)

Waxes
Carnauba, No. 3 chalky...lb.
2 N.C. ....lb.
3 N.C. ....lb.
1 Yellow ....lb.
2 ....lb.
Montan, crude ....lb.

[1] Trade mark registered.

COTTON AND FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	July 25	Aug. 29	Sept. 5	Sept. 12	Sept. 19
Sept.	12.65	11.43	11.59	12.17	....
Oct.	....	11.30	11.51	12.15	11.85
Dec.	12.40	11.36	11.53	12.17	11.90
Mar.	12.41	11.45	11.58	12.09	11.90
July	....	11.51	11.61	12.05	11.79

New York Quotations

September 26, 1936

Drills

38-inch 2.00-yard	yd.	$0.14¼
40-inch 3.47-yard		.08⅜
50-inch 1.52-yard		.19
52-inch 1.85-yard		.16
52-inch 1.90-yard		.15¼
52-inch 2.20-yard		.14
52-inch 2.50-yard		.12½
59-inch 1.85-yard		.15¾

Ducks

38-inch 2.00-yard D. F.	yd.	$0.14 /.14½
40-inch 1.45-yard S. F.		.19¾
51½-inch 1.35-yard D. F.		.20¾
72-inch 1.05-yard D. F.		.28½
72-inch 17.21-ounce		.32¼

MECHANICALS

Hose and belting	lb.	.28

TENNIS

52-inch 1.35-yard	yd.	.21⅜

***Hollands**

GOLD SEAL

20-inch No. 72	yd.	.09
30-inch No. 72		.17¼
40-inch No. 72		.18

RED SEAL

20-inch	yd.	.08¼
30-inch		.15¾
40-inch		.16½
50-inch		.21

Osnaburgs

40-inch 2.34-yard	yd.	.11⅜/.12⅛
40-inch 2.48-yard		.10¾/.11½
40-inch 2.56-yard		.10⅜
40-inch 3.00-yard		.09⅝
40-inch 7-ounce part waste		.10
40-inch 10-ounce part waste		.14
37-inch 2.42-yard		.12

Raincoat Fabrics

COTTON

Bombazine 60 x 64	yd.	.09
Plaids 60 x 48		.11¾
Surface prints 60 x 64		.12½
Print cloth, 38½-inch, 60 x 64		.06⅛

SHEETINGS, 40-INCH

48 x 48, 2.50-yard	yd.	.09¾
64 x 68, 3.15-yard		.09¼
56 x 60, 3.60-yard		.08¼
44 x 40, 4.25-yard		.06⅜

SHEETINGS, 36-INCH

48 x 48, 5.00-yard	yd.	.06
44 x 40, 6.15-yard		.04⅞

Tire Fabrics

BUILDER

17¼ ounce 60" 23/11 ply Karded peeler	lb.	.32

CHAFER

14 ounce 60" 20/8 ply Karded peeler	lb.	.30
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.31

CORD FABRICS

23/5/3 Karded peeler, 1 1/16" cotton	lb.	.31
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.29
23/5/3 Karded peeler, 1¼" cotton	lb.	.35
23/5/3 Combed Egyptian	lb.	.47

LENO BREAKER

8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.31

*For less than 1.000 yards of a width add 10% to given prices.

THE accompanying table gives the general trend of representative cotton futures for approximately the last two months. Spot middlings from September 1 and 8 fluctuated irregularly between 11.56 and 12.05¢. Announcement September 8 of the Government estimate of current crop yield caused spot middlings to rise promptly to 12.54¢, from which point the price subsided and has continued to do so, reaching 12.25¢ on September 21.

The Crop Reporting Board of the Department of Agriculture estimated production of cotton from the current crop at 11,121,000 bales. This estimate is 1,360,000 bales less than the first Government estimate of 12,481,000 bales issued August 1, and 500,000 bales under the average of private crop estimates. The following is quoted from the board's comments on its estimate:

"A United States cotton crop of 11,121,000 bales is forecast by the Crop Reporting Board of the United States Department of Agriculture based on conditions as of September 1, 1936. This is a reduction of 1,360,000 bales from the forecast as of August 1 and compares with 10,638,000 bales in 1935, 9,636,000 bales in 1934, and 14,667,000 bales the five-year (1928-32) average. The indicated yield per acre for the United States of 179.2 pounds compares with 186.3 pounds in 1935 and 169.9 pounds the ten-year (1923-32) average. It is estimated that 2.9% of the acreage in cotton on July 1 has been, or will be, abandoned, leaving 29,720,000 acres remaining for harvest."

The New York Cotton Exchange Service states, "it appears from data recently received that world consumption of the American staple in that season was approximately 12,543,000 bales, as compared with our preliminary estimate of 12,475,000, and the world carryover at the end of the season, on July 31, was 6,951,000 bales, as against our preliminary figure of 7,106,000 bales.

"These revisions are necessitated chiefly by the official returns of the Bureau of the Census on domestic consumption in July and by the statistics issued by the International Federation of Master Cotton Spinners on foreign mill stocks on July 31, which figures were not available when our preliminary estimates were published. Our estimate of consumption is closely in line with that of the International Federation, with allowance for consumption by Germany and Italy, which was not included in the International Federation report."

Fabrics

The cotton fabrics market has been exceptionally active since issuance on September 8 of the cotton report. Prices have either held steady or advanced, contrary to the price trend of raw cotton. Consumer and jobbing trades have placed bulk contracts deliverable over the remainder of this year, and growing interest is developing in deliveries over the first quarter of 1937. Mills have sold ahead to the point of engaging a high percentage of their producing capacity over near months. Increasing interest is evinced in spot merchandise.

In spite of a decline in raw material equivalent to more than $2 a bale since September 8 the cloth market is expected to continue its activity and prices to hold firm at present price ranges or go higher. All manufacturers of raincoat fabrics are doing excellent business. Children's raincoats and capes seem the most active numbers and are selling in very large volume.

A. C. S. Meetings

(*Continued from page* 56)

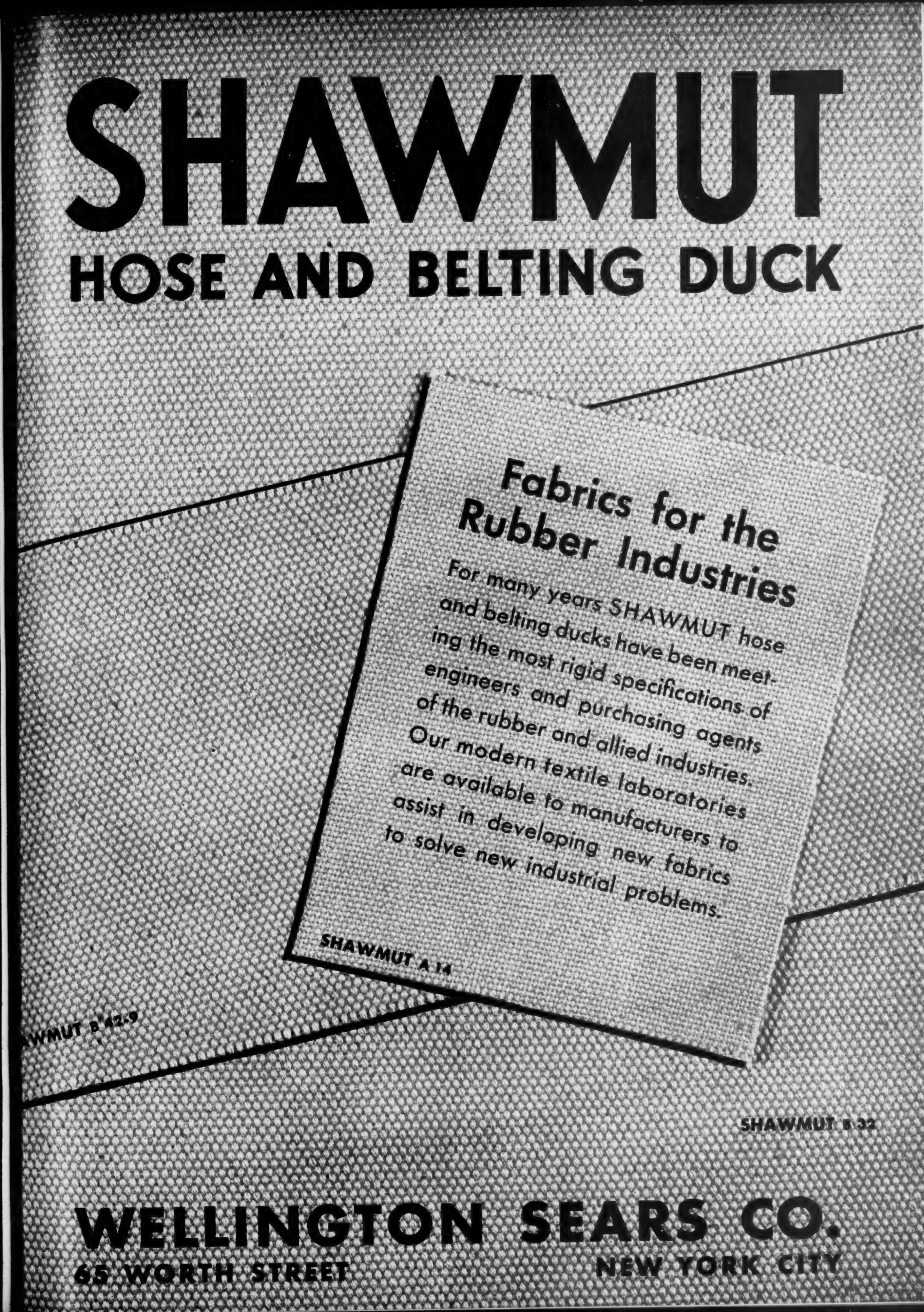
nal tetrasulphide is soft and rubberlike. The disulphide is a hard granular powder that does not have a definite melting point. Around 120° C. (248° F.) it sinters and becomes progressively softer with heat until it decomposes at about 200° C. (392° F.). The preparation of ethylene tetrasulphide is carried out in the presence of excess polysulphide, and after acidification mercaptan terminals are to be expected.

The general properties of these rubbers are capable of undergoing a change when heated at around 140° C. (284° F.) analogous to vulcanization of natural rubber. The exact mechanism of this change is not known, but a partial explanation is indicated by the facts that oxidizing agents such as di- and tri-nitrobenzene, benzoyl peroxide, etc., will effect vulcanization; while reducing agents such as pyrogallol and zinc dust will greatly retard or inhibit cure. Zinc oxide, cupric oxide, and lead peroxide are very effective; zinc oxide is the one generally used. A trace of moisture in the mix is necessary to promote the reaction when metallic oxides are used. S. Maner Martin, Jr., and J. G. Patrick.

New York Group

THE New York Group, Rubber Division, A. C. S., will hold its fall meeting Friday evening, October 9, 1936, at the Building Trades Association clubrooms, 2 Park Ave., New York, N. Y. Dinner will be served at 6.30 p.m. Two papers will be presented: one, consisting of a discussion of the comparative characteristics of American and German synthetic rubber by a member of the du Pont technical staff; and the other, "Highlights of Travel in the Orient" by David A. Shirk, president, Rare Metal Products Co., Belleville, N. J.

Tickets will be $2 each, and reservations should be made in advance by contacting Peter Pinto, secretary, 250 W. 57th St., New York.


SHAWMUT
HOSE AND BELTING DUCK
Fabrics for the Rubber Industries
For many years SHAWMUT hose and belting ducks have been meeting the most rigid specifications of engineers and purchasing agents of the rubber and allied industries. Our modern textile laboratories are available to manufacturers to assist in developing new fabrics to solve new industrial problems.
SHAWMUT A 14
SHAWMUT B 42-9
SHAWMUT B 32
WELLINGTON SEARS CO.
65 WORTH STREET
NEW YORK CITY

Patents and Trade Marks

MACHINERY

United States

20,037 (Reissue). **Belting Vulcanizer.** J. M. Bierer, Waban, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.

2,048,191. **Inner Tube Tester.** A. E. Lookholder, La Grange, Ill.

2,048,314. **Rubber Tester.** R. W. Allen, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,048,357. **Canting Device.** C. D. Smith, Fairlawn, assignor to Firestone Tire & Rubber Co., Akron, both in O.

2,048,360. **Helically Wound Tube Apparatus.** A. N. Spánel and W. C. Henry, both of Rochester, N. Y.; said Henry assignor to said Spánel.

2,048,361. **Skiver.** H. D. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,048,536. **Adjustable Tire Building Drum.** H. C. Bostwick, Coventry Township, assignor to Akron Standard Mold Co., Akron, both in O.

2,048,542. **Tire Patch Applier.** C. E. Dunlap, Sioux City, Iowa.

2,048,634. **Roller Grinder.** J. R. Keller, assignor to Black Rock Mfg. Co., both of Bridgeport, Conn.

2,048,808. **Plaster Casting Mold.** G. Oenslager, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,048,819. **Computer.** A. E. Russ, Providence, R. I., assignor to Henry L. Scott Co., a corporation of R. I.

2,048,849 and 2,048,850. **Wire Coverer.** V. F. di Lustro, Irvington, N. Y., and E. W. Flansburg, Sycamore, Ill., assignors to Anaconda Wire & Cable Co., New York, N. Y.

2,048,886. **Insulated Conductor Apparatus.** J. W. Olson, Hastings-upon-Hudson, assignor to Anaconda Wire & Cable Co., New York, both in N. Y.

2,048,893. **Wire Coverer.** P. M. Rogers, Orange, Calif., assignor to Anaconda Wire & Cable Co., New York, N. Y.

2,048,894. **Insulated Conductor Apparatus.** S. J. Rosch, Yonkers, and V. F. di Lustro, Irvington, both in N. Y., and P. M. Rogers, Orange, Calif., assignors to Anaconda Wire & Cable Co., New York, N. Y.

2,048,947. **Tire Groover.** E. Piquerez, Paris, France.

2,049,011. **Denture Apparatus.** C. Joannides, Constantinople, Turkey.

2,049,587. **Coil Making Apparatus.** P. W. Lehman, Grosse Pointe Park, and G. F. Wikle, Detroit, both in Mich., assignors to United States Rubber Co., New York, N. Y.

2,049,624. **Hose Gasket Device.** A. Ronning, Minneapolis, Minn.

2,050,614. **Time-Cycle Controller.** W. J. Kerr, assignor to Bristol Co., both of Waterbury, Conn.

2,050,740 and 2,051,010. **Cemented Pile Fabric Apparatus.** P. S. Smith, Cambridge, N. Y., assignor to R. S. Allen, Detroit, Mich.

2,051,011. **Press Mechanism.** P. S. Smith, Cambridge, N. Y., assignor to R. S. Allen, Detroit, Mich.

2,051,117 and 2,051,118. **Bag Sewer.** O. Weber, Bornum, and A. Oppermann, Konigsdahlum, both in Germany, assignors to Gummi-Tank A.-G., Rubber-Tank, Ltd., Glarus, Switzerland.

2,051,258. **Pneumatic Gage.** R. R. Hunt, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

2,051,291. **Fur-Trimmed Article Sewer.** E. W. Dunbar, Hudson, assignor to Cambridge Rubber Co., Cambridge, both in Mass.

2,051,427. **Dental Flask Holder.** A. R. Snavely, Ashland, O.

2,051,434. **Calender Accumulator System.** J. J. Cavagnaro, Ridgewood, N. J.

2,051,504. **Vulcanizer.** N. Van Cleef, assignor to Van Cleef Bros., both of Chicago, Ill.

2,051,780. **Magnetic Thickness Gage.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,051,781. **Strip Control Gage.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,052,071. **Pile Fabric Apparatus.** X. Banister, Braintree, England, assignor to N. Strachovsky, Paris, and J. F. Paulsen, Viroflay, France.

2,052,087. **Elastic Fabric Apparatus.** C. E. Drumheller, Springfield, assignor to William Carter Co., Needham Heights, both in Mass.

2,052,179. **Strip Assembling Machine.** E. Hopkinson, New York, N. Y., and F. A. Belanger, F. A. Alcott, and E. F. Hewitt, all of Waterbury, Conn., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,052,222. **Sewing Machine Folding Attachment.** F. Ebert, Oberndorf-on-the-Neckar, Germany.

2,052,448. **Elastic Joint Maker.** D. D. J. C. C. Colaert, Hazebrouck, France.

Dominion of Canada

359,516. **Margin Ornamenter and Reenforcer.** W. J. Barringham, Galt.

359,565. **Interfelted Fiber Web Apparatus.** Brown Co., assignee of M. O. Schur, both of Berlin, N. H., U. S. A.

359,762. **Preserve Tin Sealer.** G. Waner, Hannover, assignee of F. Heckel, Lübeck, both in Germany.

359,815. **Plastic Masticator.** Wingfoot Corp., Wilmington, Del., assignee of W. R. Urquhart, Akron, O., U. S. A.

359,816. **Tire Building Drum.** Wingfoot Corp., Wilmington, Del., assignee of E. G. Templeton, Akron, O., both in the U. S. A.

359,832. **Tire Retreading Mold.** P. E. Hawkinson, Minneapolis, Minn., U. S. A.

359,845. **Denture Dry Heat Mold.** F. S. Trusler, Vernon, Tex., U. S. A.

United Kingdom

444,985. **Tire Tester.** Wingfoot Corp., Wilmington, Del., U. S. A.

444,986. **Waterproof Garment Adhesive Applier.** D. Amdurer, Manchester.

445,743. **Yarn Winder.** R. Pickles, Burnley, and J. Pickles, Fence.

445,852. **Engine Packing Mold.** F. R. Hall, Wolverhampton, and Homogene Permanent Packing, Ltd., Middlesex.

445,930. **Waterproof Fabric Apparatus.** A. G. Sladdin, Brighouse.

446,067. **Tire Building Drum.** Firestone Tyre & Rubber Co., Ltd., Brentford, assignee of H. D. Stevens and R. W. Allen.

Germany

633,911. **Automatic Tire Pressure Controller.** H. Rosenthal and A. Cannata, Milan, Italy. Represented by A. Mestern, Berlin.

634,070. **Device to Make Hose with Reenforcing Inserts.** Société Anonyme des Etablissements Ch. Maillefer, Renens, Switzerland. Represented by W. Schwaebisch, Stuttgart.

PROCESS

United States

2,047,999. **Pneumatic Tire.** E. Eger, Grosse Pointe Park, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,048,450. **Stranded Conductor.** H. Horn, assignor to Norddeutsche Seekabelwerke A.-G., both of Nordenham, Germany.

2,049,554. **Temporarily Protecting Shoe Surfaces.** W. H. Wedger, Belmont, assignor to Boston Blacking & Chemical Co., Boston, both in Mass.

2,049,828. **Latex Treatment.** H. P. Stevens, assignor to Rubber Producers Research Assn., both of London, England.

2,049,845. **Knitted Elastic Fabric.** L. J. Lepine, Southport, England.

2,049,974. **Resilient Article.** J. C. Patrick, Trenton, N. J.

2,050,202. **Lawn Mower Tire.** R. W. Sohl, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,050,239. **Temporary Protective Coating.** R. W. Albright and A. Szegvari, assignors to American Anode, Inc., all of Akron, O.

2,050,272. **Chewing Gum Base.** F. V. Canning, assignor to Sweets Laboratories, Inc., both of New York, N. Y.

2,050,489. **V-Belt.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,050,706. **Bonding Rubber to Surfaces.** B. W. D. Lacey, Birmingham, and W. V. Clarke, Sutton Coldfield, both in England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

2,051,548. **Slider.** G. Dahlin, St. Catharines, Ont., Canada, assignor to Hookless Fastener Co., Meadville, Pa.

2,052,131. **Spreading, Extruding, Etc.** F. R. Chappell, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,052,151. **Rubber Thread.** G. S. Van Voorhis, Northampton, assignor to United Elastic Corp., Easthampton, both in Mass.
2,052,194. **Abrasive Wheel.** A. J. Sandorff, Niagara Falls, N. Y., assignor to General Abrasive Co., Inc., a corporation of **N. Y.**
2,052,295. **Balancing Wheels.** J. W. Hume, Jackson, Mich.
2,052,361. **Rubber Thread.** U. Pestalozza, assignor to Società Italiana Pirelli, both of Milan, Italy.
2,052,490. **Microporous Article.** W. L. Reinhardt, Shaker Heights, and L. E. Wells, Cleveland Heights, assignors to Willard Storage Battery Co., Cleveland, all in O.
2,052,516. **Sewed Garment.** M. Popper, Brooklyn, assignor to Topstitch Machine Corp., New York, both in N. Y.

Dominion of Canada

359,317. **Rug.** Sidney Blumenthal & Co., Inc., New York, N. Y., assignee of F. W. Stolzenberg, Shelton, Conn., both in the U. S. A.
359,321. **Rubberized Sheet Material.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. W. Madge and F. J. Payne, co-inventors, both of Birmingham, England.
359,378. **Milk Bottle Cap.** J. R. Gammeter, Akron, O., U. S. A.
359,424. **Adhesive Sheet Material.** Dewey & Almy Chemical Co. of Canada, Ltd., Farnham, P. Q., assignee of F. H. Russell, Needham, Mass., U. S. A.
359,433. **Curing Rubber Articles.** Industrial Process Corp., Saratoga Springs, N. Y., assignee of Liquid Carbonic Corp., assignee of H. R. Minor, both of Chicago, Ill., U. S. A.
359,581. **Storing Tennis Balls.** Dunlop Rubber Co., Ltd., London, assignee of H. Willshaw, Birmingham, both in England.
359,724. **Coloring Rubber Surfaces.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of D. F. Twiss, F. A. Jones, and D. J. Hadley, co-inventors, all of Birmingham, England.
359,817 and 359,818. **Tire Tube.** Wingfoot Corp., Wilmington, Del., assignee of W. J. Lee, Cuyahoga Falls, O., both in the U. S. A.
359,823. **Splice.** R. F. and R. A. Cruickshank, co-inventors, both of Vancouver, B. C.

United Kingdom

446,037. **Molding Abrasive Wheels.** Norton Co., Worcester, Mass., U. S. A.
446,064. **Building Slab.** Aktieselskabet for Kemisk Industri, Kastrup, and P. H. Ussing, Copenhagen, both in Denmark.
446,162. **Ornamenting Rubber.** J. E. Pollak, London. (Continental Gummi-Werke A. G., Hannover, Germany.)
446,167. **Elastic Fabric.** J. H. Dedi-Laubeck and Hussy & Kunzli A. G., both of Murg, Germany.

Germany

634,265. **Providing Latex Goods with an Adhesive Surface.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by C. Wiegand, Berlin.

CHEMICAL

United States

2,047,987. **Rubber Hydrohalides.** H. A. Winkelmann, Chicago, Ill., assignor, by mesne assignments, to Marbo Patents, Inc., a corporation of Del.
2,048,043. **Accelerator.** I. Williams and C. W. Croco, assignors to E. I. du Pont de Nemours & Co., all of Wilmington, Del.
2,048,781. **Antioxidant.** D. Craig, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,048,822 and 2,048,823. **Antioxidant.** W. L. Semon, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,049,087. **Cellulose Derivative Treatment.** R. L. Sibley, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., Wilmington, Del.
2,049,229. **Accelerator.** R. L. Sibley, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., Wilmington, Del.
2,049,415. **Wire Insulation Compound.** E. B. Curtis, Yonkers, assignor to United States Rubber Products, Inc., New York, both in N. Y.
2,049,618. **Rubber Composition.** F. J. Major, Ocean Park, Calif., assignor, by mesne assignments, to Run-Ban Co., Steubenville, O.
2,049,785. **Accelerator.** W. F. Tuley, Naugatuck, Conn., assignor to United States Rubber Products, Inc., New York, N. Y.
2,049,832. **Acoustic Material.** J. Dean, San Francisco, Calif., assignor of 1/4 to D. Campbell.
2,049,943. **Obtaining Chlorinated Rubber.** K. Bromig, assignor to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, both of Frankfurt a. M., Germany.
2,050,190. **Accelerator.** J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,050,193. **Rubber Compounding Ingredient.** C. R. Park, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.
2,050,195. **Accelerator.** L. B. Sebrell, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.
2,050,196 and 2,050,197. **Preserving Cotton Cord.** L. B. Sebrell, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.
2,050,198. **Accelerator.** L. B. Sebrell, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.
2,050,199. **Accelerator.** L. B. Sebrell, Silver Lake, O., assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.
2,050,203. **Accelerator.** J. Teppema, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.
2,050,208. **Accelerator.** H. I. Cramer, Cuyahoga Falls, O., assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.
2,050,209. **Wax-Like Composition.** S. D. Gehman, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,050,595. **Rubber - Like Composition.** J. E. Wolfe, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,051,338. **Latex Composition.** M. R. Isaacs, Philadelphia, Pa.
2,051,849. **Tacky Rubber Dusting Powder.** E. L. Hanna, N. Scituate, R. I., assignor to Davol Rubber Co, a corporation of R. I.
2,051,944. **Moistureproofing Composition.** A. Hershberger, Kenmore, N. Y., assignor, by mesne assignments, to E. I. du Pont de Nemours & Co., Wilmington, Del.
2,052,391. **Liquid Coating Composition.** H. A. Endres, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.
2,052,411. **Rubber Derivative.** S. S. Kurtz, Jr., Merion, Pa., assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.
2,052,423. **Rubber Condensation Derivative.** L. B. Sebrell, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.
2,052,435. **Rubber Condensation Derivative.** G. M. Wright, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

359,237. **Hydrogenating Isoprene.** Carbide & Carbon Chemicals Corp., New York, N. Y., assignee of G. A. Perkins, S. Charleston, W. Va., both in the U. S. A.
359,337. **Rubber Processing.** Western Electric Co., Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., both in the U. S. A.
359,430. **Antioxidant.** B. F. Goodrich Co., New York, N. Y., assignee of W. L. Semon, Silver Lake, O., both in the U. S. A.
359,463. **Formylizing Accelerator.** Sylvania Industrial Corp., Fredericksburg, Va., U. S. A., assignee of R. Weingand and I. Koberne, co-inventors, both of Bomlitz b. Walsrode, Germany.
359,473. **Accelerator.** Wingfoot Corp., Wilmington, Del., assignee of J. Teppema, Cuyahoga Falls, O., both in the U. S. A.
359,571. **Coating Composition.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. S. Melvin, Carneys Point, N. J., U. S. A.
359,623. **Latex Composition.** Dominion Rubber Co., Ltd., Montrael, P. Q., assignee of W. E. Messer, Cheshire, Conn., U. S. A.
359,737. **Accelerator.** Goodyear Tire & Rubber Co., Akron, assignee of L. B. Sebrell, Silver Lake, both in O., U. S. A.
359,764, 359,765, 359,766, and 359,767. **Accelerator.** Wingfoot Corp., Wilmington, Del., assignee of H. I. Cramer, Cuyahoga Falls, O., both in the U. S. A.
359,789. **Sponge Rubber.** Collins & Aikman Corp., Philadelphia, assignee of G. S. Hiers, Bala Cynwyd, both in Pa., U. S. A.
359,821. **Tire Sealing Composition.** C. Beecher, co-inventor with and assignee of W. G. Boomer, both of Regina, Sask.

United Kingdom

445,148. **Rubber - Resin Composition.** Naamlooze Vennootschap De Bataafsche Petroleum Maatschappij, The Hague, Holland, assignee of W. J. Hund, Oakland, and L. Rosenstein, San Francisco, both in Calif., U. S. A.
445,301. **Rubber Composition.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.
445,534. **Tackiness Preventive.** J. Talalay and Magna Rubber Co., Ltd., both of Bedford.

445,541 and 445,542. **Rubber Dispersion.** Dunlop Rubber Co., Ltd., London, and E. A. Murphy and E. W. Madge, both of Birmingham.
445,591. **Rubber Composition.** M. J. Stam and Rubber-Latex-Poeder-Cie Naamlooze Vennootschap, both of The Hague, Holland.
445,631. **Porous Rubber Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and E. A. Murphy and E. W. Madge, both of Birmingham.
445,805. **Accelerator.** Coutts & Co., London, and F. Johnson, Eastbourne, representatives of J. Y. Johnson. (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)
445,813. **Age Resister.** Standard Oil Development Co., Linden, N. J., U. S. A.
445,854. **Cork Substitute.** R. B. Bruguera, Gerona, Spain.
445,940. **Rubber Composition.** Dunlop Rubber Co., Ltd., London, and D. F. Twiss and F. A. Jones, both of Birmingham.
446,103. **Chlorinated Rubber.** W. D. Spencer and S. Steele, both of Widnes, and Imperial Chemical Industries, Ltd., London.
446,173. **Condensation Product.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.
446,190. **Plastic Composition.** Crosse & Blackwell, Ltd., W. Clayton, and R. I. Johnson, all of London.
446,343. **Artificial Resin Composition.** D. D. Pratt, Teddington.
446,385. **Active Carbon.** G. Caraile and E. Gardiol (trading as I. A. C. Soc. Per l'Industria Articoli Caoutchouc E per Materiali Protettivi ed Antigas), both of Tivoli, Italy.
446,448. **Waste Rubber Oil.** L. Biseo, Rome, Italy.
446,540. **Paint.** R. Kuftner, Wiesbaden, Germany.
446,568. **Wetting Agent.** Selden Co., New York, N. Y., assignee of A. O. Jaeger, Greentree, Pa., both in the U. S. A.

Germany

533,875. **Masses Containing Chlorinated Rubber.** I. G. Farbenindustrie A.G., Frankfurt a.M.
633,876. **Reclaiming Old Rubber.** A. Gorgas, Altona-Gross-Flottbek.

GENERAL

United States

2,047,937. **Refrigerator Display Case.** S. Bohn, Passaic, N. J., and H. D. King, Cuyahoga Falls, O., assignors to American Hard Rubber Co., New York, N. Y.
2,047,971. **Automobile Support.** O. A. Larsen, assignor of 24½% to D. J. Larsen, both of Salt Lake City, Utah.
2,047,976. **Joint.** H. C. Lord, Erie, Pa.
2,047,977. **Container Seal.** W. I. McGowan, Cambridge, assignor to Dewey & Almy Chemical Co., N. Cambridge, both in Mass.
2,048,059. **Respiratory Apparatus.** J. M. G. Giraudet de Boudemange, Paris, France.
2,048,185. **Textile-Rubber Shoe.** I. and L. Dorogi, assignors of ½ to Magyar Ruggyantaárugyár Reszvenytarsaság, all of Budapest, Hungary.
2,048,219. **Bottle Closure.** E. Putter, Berlin-Charlottenburg, assignor to Schering-Kahlbaum A. G., Berlin, both in Germany.
2,048,240. **Car Wheel.** R. J. Wittmer, Cleveland Heights, assignor to National Malleable & Steel Castings Co., Cleveland, both in O.
2,048,256. **Oscillating Pivot Joint Unit.** H. D. Geyer, Dayton, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.
2,048,294. **Footwear.** E. F. Roberts, Mamaroneck, assignor to United States Rubber Co., New York, both in N. Y.
2,048,340. **Heel.** F. R. Keith, Randolph, Mass.
2,048,344. **Waterproof Pocket.** L. L. Lillie, Washington, D. C.
2,048,392. **Colostomy Appliance.** H. F. Koenig, Chicago, Ill.
2,048,412. **Refrigerator Tray.** J. Sissman, Chicago, Ill., assignor to Copeman Laboratories Co., Flint, Mich.
2,048,438. **Mat.** A. T. Ecklund, assignor of ½ to W. C. Price, both of Jamestown, N. Y.
2,048,474. **Mat.** L. F. Schuhmacher, assignor to Schuhmacher & Schneider Patents, Inc., both of Chicago, Ill.
2,048,475. **Friction Padding Material.** W. J. Slagle, Cambridge, assignor to Dewey & Almy Chemical Co., N. Cambridge, both in Mass.
2,048,492. **Foundation Garment.** M. Ciringione, Woodside, assignor to Lay & Way Co., Inc., New York, both in N. Y.
2,048,531. **Brassiere.** G. M. P. Yerkes, Hartsdale, assignor to G. M. Poix, Inc., New York, both in N. Y.
2,048,544. **Separable Fastener.** K. M. Fritts, Erie, Pa.
2,048,575. **Vehicle Wheel.** E. H. South, Salisbury, Southern Rhodesia.
2,048,581. **Refrigerator Seal.** G. F. Weiher, assignor to General Motors Corp., both of Dayton, O.
2,048,631. **Printing Plate.** W. T. Motson, Sr., Philadelphia, Pa.
2,048,635. **Tire Tread.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.
2,048,638. **Brassiere.** E. C. McKeefrey, assignor to Model Brassiere Corp., both of Brooklyn, N. Y.
2,048,683. **Resilient Heel.** O. Brockman, Louisville, Ky.
2,048,771. **Hydraulic Transmission.** P. S. Baldwin, Florence, Italy.
2,048,792. **Wiping Tool.** G. A. Hendey, Rome, N. Y.
2,048,807. **Composite Rubber Sheet.** A. L. Murray, Auburn, Ind.
2,048,841. **Stereotype Blanket.** J. J. Coyne, Forest Hills, N. Y.
2,048,843. **Valve Insides.** J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.
2,048,852. **Clean-Out Device.** D. Dumas, Bakersfield, Calif.
2,048,858. **Valve.** R. H. Gibbs, Floral Park, assignor of ½ to M. Blake, Garden City, both in N. Y.
2,048,905. **Abrasive Article.** D. E. Webster, assignor to Norton Co., both of Worcester, Mass.
2,049,024. **Oscillating Joint.** I. W. Robertson, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,049,048. **Shoe Press.** W. C. Card, Jr., Winthrop, Mass., assignor to Compo Shoe Machinery Corp., New York, N. Y.
2,049,063. **Machinery Packing.** C. R. Hubbard, assignor to Garlock Packing Co., both of Palmyra, N. Y.
2,049,133. **Vibration Damper.** T. H. Peirce, Detroit, assignor to Chrysler Corp., Highland Park, both in Mich.
2,049,144. **Brake Lever.** N. E. Wahlberg, Kenosha, Wis., assignor to Oakes Products Corp., N. Chicago, Ill.
2,049,200. **Storage Battery.** C. J. Dunzweiler, Cleveland, and A. C. Zachlin, S. Euclid, assignors to Willard Storage Battery Co., Cleveland, all in O.
2,049,201. **Invertible Storage Battery.** C. J. Dunzweiler, Cleveland, and R. M. Raney, Euclid, assignors to Willard Storage Battery Co., Cleveland, all in O.
2,049,210. **Vehicle Bumper.** A. A. Lindauer, assignor to Safety Cushion Bumper & Mfg. Co., both of Detroit, Mich.
2,049,220. **Waterless Ice Bag.** M. E. Pearce, Monkton, Md.
2,049,227. **Shoe.** C. F. and F. A. Rohn, both of Milwaukee, Wis.
2,049,252. **Valve Stem.** B. C. Eberhard, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,049,257. **Offset Printing Press.** H. Gould, Brooklyn, and F. Ackerman, New York, both in N. Y.
2,049,273. **Impact Tool.** R. H. Pott, Evansville, Ind.
2,049,324. **Grinding Tool.** J. Schneider, Oberursel, assignor to Deutsche Gold- und Silber Scheideanstalt vormals Roessler, Frankfurt a. M., both in Germany.
2,049,365. **Glass Washer.** I. L. Follett, Washington, D. C.
2,049,374. **Vehicle Wheel.** L. Härter, Dresden, Germany.
2,049,380. **Inflatable Umbrella.** C. Huber, New York, N. Y.
2,049,452. **Roller.** J. J. Kelly and L. Sommer; B. E. Ettelson, executor of said L. Sommer, deceased, assignors to Kelly Process, Inc., all of Portland, Ore.
2,049,453. **Shoe Bottom Pressure Applier.** F. Kennison and J. R. O'Brien, both of Beverly, Mass., assignors to United Shoe Machinery Corp., Paterson, N. J.
2,049,474. **Vehicle.** S. Smith, Chobham, England.
2,049,531. **Vacuum Operated Switch.** J. W. White, Detroit, Mich.
2,049,532. **Pressure Gage.** S. T. Williams, Bellerose, assignor to A. Schrader's Son, Inc., Brooklyn, both in N. Y.
2,049,544. **Horseshoe Screw Calk.** M. Mücklich, Dresden, Germany.
2,049,551. **Cushion.** W. C. Van Dresser, assignor to Van Dresser Specialty Corp., both of Detroit, Mich.
2,049,560. **Electric Plug.** S. T. Ezzo, Port Henry, N. Y.
2,049,598. **Sole.** I. I. Tubbs, Superior, Wis.
2,049,599. **Rubber Stamp Mount.** S. M. Weissman, Chicago, Ill.
2,049,723. **Rubber Ice-Skull.** E. Pomeranz, San Clemente, Calif.
2,049,803. **Hosiery.** H. Hardie, assignor to Faultless Mfg. Co., both of Baltimore, Md.
2,049,820. **Battery Marker and Tag Holder.** A. W. Myhre, Orland, Calif.
2,049,840. **Heel.** H. T. Hughes, assignor of 50% to F. W. Goakes, both of Cleveland, O.
2,049,973. **Mucilage Spreader Cap.** G. W. Nesmith, Tulsa, Okla.
2,050,070. **Vehicle Body and Door Therefor.** S. Smith, Chobham, England.

2,050,071. **Hinge.** S. Smith, Chobham, England.
2,050,097 and 2,050,098. **Telephone Protector.** G. Kalenoff, Brooklyn, N. Y.
2,050,111. **Scalp Blower.** M. McKelvey, Toms River, N. J.
2,050,141. **Automobile Life Preserver.** R. L. Wethington, Columbia, Ky.
2,050,176. **Handle Pad.** H. A. Hammerich, New York, N. Y.
2,050,213 and 2,050,214. **Combination Compound Tube.** W. Stephens, deceased, by E. Stephens, executrix, both of Akron, O.; said Stephens, assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.
2,050,337. **Boot.** W. Kelley, Needham, Mass.
2,050,352. **Aero and Auto Tire.** J. V. Martin, Garden City, N. Y.
2,050,402. **Golf Ball.** J. F. Walsh, S. Orange, N. J., assignor to Celluloid Corp., a corporation of N. J.
2,050,407. **Syringe.** F. J. Wolff, Morrisville, Pa.
2,050,410. **Athletic Garment.** L. G. Baer, assignor to West Coast-Manchester Mills, Inc., both of Los Angeles, Calif.
2,050,435. **Automobile Bumper.** F. C. Howard, assignor to American Automatic Devices Co., both of Chicago, Ill.
2,050,441. **Cushion Wheel.** F. Mead, Chicago, Ill.
2,050,535. **Stocking.** E. J. Martel, Laconia, N. H.
2,050,604. **Central Buffing and Draft Gear.** R. T. Glascodine, London, England.
2,050,622. **Nursing Bottle Support.** L. L. Menk, Shaker Heights, O.
2,050,733. **Double Glazing Device.** W. C. Ross, Winchester, assignor to Dewey & Almy Chemical Co., N. Cambridge, both in Mass.

Dominion of Canada

359,188. **Tubular Connection.** N. A. Desmarteau, Montreal, P. Q.
359,209. **Shirt and Collar.** T. L. Shepherd, Brighton, England.
359,212. **Spring.** A. Spencer, London, England.
359,245. **Tire.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. M. Cadwell, Grosse Pointe Village, Mich., U. S. A.
359,251. **Fur-Trimmed Overshoe.** Robert Simpson Co., Ltd., Toronto, Ont., assignee of H. G. Minhinnick, Montreal, P. Q.
359,281. **Arch Support.** Scholl Mfg. Co., Inc., Chicago, Ill., U. S. A., assignee of C. F. Scholl, London, England.
359,297. **Tire.** United States Rubber Co., New York, N. Y., assignee of Morgan & Wright, Detroit, Mich., assignee of E. Hopkinson, deceased, New York, N. Y., all in the U. S. A.
359,302. **Electrical Terminal.** Western Electric Co., Inc., New York, N. Y., assignee of J. H. Ingmanson, Rahway, N. J., both in the U. S. A.
359,344. **Tire.** H. N. Cupp, Mars, Pa., U. S. A.
359,354. **Motor Vehicle.** J. Kolbe, Hannover, Germany.
359,385. **Wheel.** E. H. Piron, New York, N. Y., U. S. A.
359,396. **Garment.** F. E. Waterman, Jr., New Bedford, Mass., U. S. A.
359,425. **Tire Tube.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Eger, Detroit, Mich., U. S. A.
359,426. **Golf Ball.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of N. G. Madge, Providence, R. I., U. S. A.
359,489. **Trousers.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. Adamson, Rye, N. Y., U. S. A.
359,548. **Nipple Venting Valve.** Y. H. Kurkjian, Paterson, N. J., U. S. A.
359,549. **Nipple.** Y. H. Kurkjian, Paterson, N. J., U. S. A.
359,585. **Cable.** W. T. Henley's Telegraph Works Co., Ltd., London, assignee of P. Dunsheath, Sidcup, both in England.
359,622. **Overshoe.** Cambridge Rubber Co., Cambridge, assignee of E. W. Dunbar, Hudson, both in Mass., U. S. A.
359,777. **Battery Vent Plug.** Aetna Rubber Co., assignee of S. T. Campbell, both of Cleveland, O., U. S. A.
359,790. **Electric Plug.** Crossley Radio Corp., assignee of R. H. Money, both of Cincinnati, O., U. S. A.
359,829. **Air Cushion.** R. Beaudoin, St.-Adelphe, P. Q.
359,831. **Cushion Shoe.** J. H. Everston, Milwaukee, Wis., U. S. A.
359,843. **Motor Mounting.** A. L. Scott, Holicong, Pa., U. S. A.

United Kingdom

444,202. **Railway Vehicle Tire.** M. Kahn, Reihl, Germany.
444,549. **Conveyer.** H. S. Johns, Hamilton, Ont., Canada.
444,600. **Trouser Supporter.** Ideal Clothiers, Ltd., and D. M. Dorr, both of Wellingborough.
444,791. **Glove.** L. and M. Auster, both of New York, N. Y., U. S. A.
444,800. **Sole Laying Press.** G. A. Mussells, Reading, Mass., U. S. A.
444,828. **Belt.** H. F. Anns, Westminster.
444,870. **Tire.** J. Sigales-Bofill and A. Puigcarbo-Serra, both of Barcelona, Spain.
444,961. **Fire Extinguisher.** S. F. Warren, Harrow, and J. C. Y. Baker, Wembley.
445,006. **Handle Bar.** P. Franken, Dusseldorf, Germany.
445,026. **Tee.** N. G. Kazandjian, Southport, and M. Doudian, Manchester.
445,049. **Draught Excluder.** W. Timberlake, Thorpe Bay.
445,061. **Tire Pressure Gage.** W. Turner, Sheffield.
445,088. **Arch Supporting Pad and Bandage.** E. Allschoff, Berlin, Germany.
445,102. **Paper Bag.** Low Temperature Carbonisation, Ltd., and J. H. Stephens, both of Westminster.
445,111. **Vehicle Spring Suspension.** W. J. Tennant, London. (Tatra Works, Ltd., Prague, Czechoslovakia.)
445,116. **Carton.** Thompson & Norris Mfg. Co., Ltd., and A. C. Mason, both of London.
445,119. **Vehicle Body.** W. E. Knight, London.
445,173. **Eyelash Curler.** Kurlash Co., Inc., Rochester, N. Y., U. S. A.
445,195. **Electrically Heated Blanket.** F. Grisley, Leigh-on-Sea.
445,197. **Sewing Machine.** H. C. Pass, Toronto, Ont., Canada.
445,230. **Band Clip.** F. J. T. Barnes, Newstead, Brisbane, Australia.
445,255. **Resilient Joint.** M. Houdaille and C. Lecler, both of Levallois-Perret, France.
445,257. **Atomizer.** J. Viessiere, Paris, France.
445,299. **Rubber Tapping Knife.** L. E. Russell, Latpandura, Ceylon.
445,341. **Artificial Denture.** Wingfoot Corp., Wilmington, Del., U. S. A.
445,367. **Suction Nozzle.** Electrolux, Ltd., Luton, assignee of Inventia Patent-Verwertungs-Ges., Schaffhausen, Switzerland.
445,387. **Elastic Band.** A. Scheitlin, Zurich, Switzerland.
445,420. **Wheel.** A. J. Fortescue, Arncliffe, Australia.
445,441. **Air Compressor.** G. Szekely, Graz, Austria.
445,478. **Safety Glass.** O. Rohm, Darmstadt, Germany.
445,484. **Centrifugal Pump.** Bolidens Gruvaktiebolag, Stockholm, Sweden.
445,493. **Belt Tensioner.** H. W. Swift, Shipley, and F. Sykes, Golcar.
445,512. **Grinding Wheel.** Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, Frankfurt a. M., Germany.
445,530. **Pianoforte.** T. H. Doig, Cambuslang, Scotland.
445,583. **Telephone Directory.** G. L. Clarke, Erith, and T. S. Hake, Enfield.
445,590. **Dart.** G. J. Doel, High Wycombe.
445,622. **Sock.** I. & R. Morley, Ltd., and H. F. Butter, both of London.
445,643. **Valve.** Michelin & Cie., Clermont Ferrand, France.
445,704. **Valve.** H. Todd, Belfast, Ireland.
445,710. **Condenser.** R. B. Peacock, Knebworth, K. L. Sanders, Runcorn, and Imperial Chemical Industries, Ltd., London.
445,732. **Bicycle.** F. L. Markey, Exeter, N. H., and H. Stoehrer, Manatee, Fla., both in the U. S. A.
445,752. **Fountain Pen.** L. Kutter and R. Heller, both of Vienna, Austria.
445,783. **Cycle Lamp.** J. Lucas, Ltd., and F. Hanmer, both of Birmingham.
445,807. **Shoe.** C. Clutsom, Ashby de la Zouch.
445,815. **Soap.** C. I. Meyer, Paris, France.
445,835. **Compound Sheet Material.** B. Nordon, Berlin, Germany.
445,838. **Compound Sheet Material.** L. Dufay, Doubs, France.
445,895. **Toe Regulator.** R. Grenfell, Ashton-on-Ribble.
445,920. **Gear Wheel.** Westinghouse Electric & Mfg. Co., E. Pittsburgh, assignee of W. A. Brecht, Pittsburgh, both in Pa., U. S. A.
445,929. **Massager.** F. N. Pickett, Westminster.
445,941. **Cable Suspender.** Pirelli-General Cable Works, Ltd., and J. R. Harding, both of London.
445,943. **Joint Packing.** E. E. Cooper and A. T. Troedel, both of Port Melbourne, Victoria, Australia.
445,988. **Gas Mask.** Etablissements Luchaire, Saint-Ouen, and C. F. J. M. Bertin, Le Havre, both in France.
445,991. **Hair Waver.** J. Waret, Villiers-sur-Marne, France.
445,997. **Inflatable Life Belt.** J. Fromm, Berlin, Germany.

Germany

633,848. **Self-Sealing Pneumatic Tire.** W. Othmer, Dortmund.
633,885. **Sole and Heel.** F. Haufe, Cottbus.
634,101. **Cable.** Siemens - Schuckertwerke A.G., Berlin-Siemensstadt.

U. S. Crude and Waste Rubber Imports for 1936

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1936	Totals 1935	Balata	Miscellaneous	Waste
Jan. ....tons	29,130	1,263	597	167	65	70	..	31,292	42,059	20	870	122
Feb.	33,203	1,146	550	217	28	75	..	35,219	35,383	95	665	184
Mar.	35,675	1,296	390	35	15	40	..	37,451	44,041	60	620	142
Apr.	38,286	1,324	559	75	21	100	..	40,365	43,545	167	1,013	456
May	34,048	1,033	342	79	10	88	..	35,600	26,766	146	391	224
June	39,900	1,534	226	58	20	64	..	41,802	38,340	88	662	126
July	34,277	1,244	233	25	6	62	..	35,847	46,880	66	821	95
Aug.	40,742	1,486	50	126	12	147	..	42,563	38,655	142	523	155
Total, 8 mos., 1936 ......tons	285,261	10,326	2,947	782	177	646	..	300,139	......	784	5,565	1,504
Total, 8 mos., 1935 ......tons	303,884	7,152	3,671	525	137	300	..	......	315,669	513	4,082	162

Compiled from The Rubber Manufacturers Association, Inc., statistics.

Tire Production Statistics

	Pneumatic Casings—All Types		
	Inventory	Production	Total Shipments
1933	8,888,070	45,304,230	44,093,714
1934	9,454,985	47,232,748	46,686,545
1935	8,195,863	49,361,781	50,183,129
1936			
Jan.	8,918,177	4,578,710	3,874,764
Feb.	9,264,595	3,577,221	3,211,040
Mar.	9,087,020	3,637,969	3,855,970
Apr.	9,034,017	4,854,133	4,902,721
May	8,176,296	4,970,993	5,831,964
June	7,832,911	5,609,789	5,792,319
July	7,746,388	5,464,927	5,743,863
	Inner Tubes—All Types		
1933	7,814,926	42,555,861	41,390,591
1934	9,179,893	46,227,807	45,045,495
1935	8,231,351	47,879,034	48,066,904
1936			
Jan.	8,622,522	4,591,791	4,167,711
Feb.	8,699,228	3,556,098	3,445,767
Mar.	8,691,651	3,787,226	3,795,505
Apr.	8,788,043	4,824,199	4,746,265
May	8,719,467	4,818,960	4,918,715
June	8,104,830	5,034,595	5,503,564
July	7,724,790	5,177,430	5,758,273

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 1935, 81% for 1936, and 80% for previous years, with the exception of gasoline consumption.

	Solid and Cushion Tires		
	Inventory	Production	Total Shipments
1933	26,271	130,987	126,990
1934	34,710	197,497	187,152
1935	46,406	283,606	275,741
1936			
Jan.	40,193	25,443	22,670
Feb.	......	14,730	17,172
Mar.	......	16,004	21,350
Apr.	......	32,807	32,611
May	......	29,674	30,378
June	......	36,856	35,617
July	......	38,904	34,445

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%) Gallons
	Cotton Fabric Pounds	Crude Rubber Pounds	
1933...	148,989,293	512,489,423	15,880,746,000
1934...	196,069,495	697,558,218	17,063,298,000
1935...	202,318,119	756,773,779	18,167,352,000
1936			
Jan....	15,987,906	61,457,999	1,367,226,000
Feb....	12,059,051	45,839,772	1,150,842,000
Mar...	13,416,664	47,872,526	1,506,582,000
Apr....	16,570,836	64,211,819	1,630,650,000
May...	17,098,812	66,119,211	1,764,294,000
June..	18,494,366	69,251,427	1,874,460,000
July...	18,250,725	69,637,586	1,961,064,000

United States Latex Imports

Year	Pounds	Value
1933	24,829,861	$1,833,671
1934	29,276,134	3,633,253
1935	30,358,748	3,782,222
1936		
Jan.	3,733,665	474,682
Feb.	3,268,542	406,985
Mar.	3,196,083	417,704
Apr.	3,610,511	522,049
May	3,296,351	490,769
June	4,250,178	657,311
July	3,729,418	579,895

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for August, 1936:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	2,685	328
United States	27,030	603
Continent of Europe..	5,117	394
British possessions ...	4,106	106
Japan	2,633	28
Other countries	466	10
Totals	42,037	1,469

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	3,699	1,228
Dutch Borneo	2,006	23
Java and other Dutch islands.	100	19
Sarawak	2,153	..
British Borneo	314	16
Burma	70	4
Siam	2,318	1,029
French Indo-China	154	121
Other countries	102	5
Totals	10,916	2,445

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Czechoslovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1933	398,400	73,300	13,500	11,200	19,300	10,400	63,100	54,100	19,300	66,900	30,800	41,200	801,500
1934	439,100	158,500	9,600	9,100	28,400	11,000	50,400	59,300	21,400	69,900	47,300	60,500	964,500
1935	455,757	128,829	9,977	7,593	26,868	11,225	52,322	62,901	23,916	57,589	37,576	56,725	931,278
1936													
Jan.	33,260	4,573	1,260	760	1,758	767	6,770	5,545	1,500*	4,357	467	5,121	56,138
Feb.	33,789	1,271	735	779	1,900	344	6,288	5,257	1,000*	2,787	94	5,268	59,512
Mar.	33,743	1,227	819	1,033	1,809	410	4,342	4,568	1,000*	5,172	4,376	5,433	61,478
Apr.	44,949	2,097	969	1,097	1,079	603	4,261	5,497	1,500*	4,931	3,251	4,723	70,763
May	35,549	302	1,053	698	2,221	667	4,345	4,639	1,000*	5,531	4,500*	4,403	64,908
June	35,901	1,493	1,693	579	2,042	323	4,857	5,698	1,500*	4,567	4,500*	4,214*	64,381

* Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Africa	South America	Mexican Guayule	Grand Total
1933	445,800	282,300	63,800	1,400	3,400	7,800	11,100	7,000	17,300	839,900	1,200	2,300	10,100	0	853,500
1934	467,400	379,400	79,100	6,500	6,300	11,100	17,700	17,700	19,600	1,004,800	1,400	3,500	9,100	400	1,019,200
1935	417,005	282,858	54,316	9,054	4,914	8,885	19,465	28,327	28,677	853,501	1,537*	5,031	12,194	459	872,722
1936															
Jan.	26,637	20,778	4,178	419	874	938	2,317	1,665	2,449	60,255	105	494	1,796	70	62,720
Feb.	19,692	27,991	3,664	871	511	529	2,107	3,663	2,894	61,922	225	620	1,177	75	64,019
Mar.	34,597	19,393	4,336	750	574	342	1,848	2,966	2,553	67,359	104	535	1,175	40	69,213
Apr.	21,667	25,254	3,172	413	817	869	2,053	1,596	2,416	58,257	92	533	1,044	103	60,029
May	34,108	22,121	2,560	632	485	517	2,354	2,077	2,281	67,135	103	493	1,018	88	68,837
June	25,115	26,401	3,766	673	553	461	1,386	3,737	2,733	64,825	153	456	947	97	66,478
July.	34,214	33,790	3,782	1,079	323	1,035	1,399	3,734	2,737	82,093	150*	500*	1,013	100*	83,856

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

INSULATED WIRE COMPOUNDER. NOW HOLDING RESPONsible executive position with large concern. Ten years' research and development work, control and factory supervision. Familiar with all latest advances. Address Box No. 709, care of INDIA RUBBER WORLD.

MAN, 20 YEARS' EXPERIENCE IN CALENDER AND MILL ROOM, also compounding, capable of taking charge of calender room and mill. Can give excellent reference. Address Box No. 713, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER: AMERICAN: 15 YEARS' EXPERIENCE in rubber, synthetic plastics, and resins. Research; commercial development and technical sales-service. Capable supervising production or develop new project. Excellent background and references. Available on short notice. Address Box No. 714, care of INDIA RUBBER WORLD.

EXECUTIVE, NOW EMPLOYED, DESIRES POSITION OF REsponsibility in large or small plant. Years of practical experience in development, compounding, and production of mechanicals, tires, tubes, etc. Also practical knowledge of reclaiming. Address Box No. 715, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, PRODUCTION MANAGER, FIVE YEARS' practical experience, good appearance and personality, now employed, best references, desires position of responsibility in plant or sales. Address Box No. 716, care of INDIA RUBBER WORLD.

PRODUCTION EXECUTIVE, WITH PRACTICAL TECHNICAL knowledge based on years of experience in hard rubber, soft mechanicals, extruded and wrapped goods, capable of operating all departments from compounding to shipping, purchasing, costing, and design of equipment or product. Address Box No. 719, care of INDIA RUBBER WORLD.

WANTED: POSITION AS A FOREMAN IN MILL ROOM AND calender. Have 20 years' practical experience in mechanicals, tires, and footwear. Reference if desired. Address Box No. 721, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, M. I. T. GRADUATE, 8 YEARS' EXPERIENCE compounding, developing, research. Mechanical and dipped goods, rubber thread, latex compounding. Address Box No. 725, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

WANTED: SUPERINTENDENT OR FOREMAN with complete knowledge of the manufacture of rubber thread as used in golf balls. Our organization knows of this advertisement. All correspondence strictly confidential. Address Box No. 711, care of INDIA RUBBER WORLD.

NEED CAPABLE MEN TO ASSIST SETTING UP AND OPERATing small Ohio soft tubing plant. State qualifications fully. Address Box No. 710, care of INDIA RUBBER WORLD.

SALESMAN WANTED

Man 25-35 years old who has had chemical or engineering experience in the rubber field for sales work with important rubber manufacturer. References required. Address Box No. 712, care of INDIA RUBBER WORLD.

ESTABLISHED COMPANY ENLARGING STAFF HAS OPENINGS for two graduate chemical engineers. Some experience in rubber industry or with chemical processes requiring high pressures desirable. Permanent positions, development and factory control. Give salary desired and detailed experience. Address Box No. 722, care of INDIA RUBBER WORLD.

CHEMIST FOR PLANT LOCATED IN THE METROPOLITAN area, preferably man having experience involving both rubber and lacquer finishes. Permanent connection and excellent opportunity can be offered to man properly qualified. Address Box No. 724, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

FOR SALE OR RENT: RUBBER PLANT NEAR PHILADELPHIA fully equipped for operating, machinery, presses, calenders, new boiler, artesian well, etc.; 9,000 square feet in building. An opportunity. Wynne James, Jr., Doylestown, Pa.

PARISIAN FIRM HANDLING CHEMICAL PRODUCTS, VISITING regularly the rubber and derivative industries, in France and neighboring countries, seeks to represent an American manufacturer of products of the highest order STE. DES PRODUITS POUR L' INDUSTRIE & L' AGRICULTURE, 23 rue du Renard, Paris, France.

(*Advertisements continued on page 89*)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	June, 1936		Six Months Ended June, 1936	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	81,481,152	$12,073,632	481,169,871	$65,278,985
Liquid latex	4,250,178	657,311	21,355,330	2,969,500
Jelutong or pontianak	1,717,182	186,274	7,778,102	736,064
Balata	74,121	13,671	726,301	119,023
Gutta percha	105,430	18,053	2,129,764	385,059
Guayule	217,500	18,380	1,059,500	89,461
Siak, scrap, reclaimed, etc.	1,352,144	34,509	6,970,521	153,536
Totals	89,197,707	$13,001,830	521,189,389	$69,704,628
Chicle, crude ... *Free*	229,089	$51,762	4,558,858	$1,111,241
MANUFACTURED—*Dutiable*				
Rubber tires ... *number*	1,906	$3,586	51,570	$308,777
Rubber boots, shoes, and **overshoes ... *pairs***	9,306	1,166	33,934	7,133
Rubber soled footwear with fabric uppers ... *pairs*	148,349	21,031	590,473	127,212
Golf balls ... *number*	96,312	14,510	384,666	61,442
Lawn tennis balls... *number*	47,112	6,024	374,547	36,824
Other rubber balls... *number*	529,170	14,268	2,988,489	96,028
Other rubber toys, except balls	186,720	15,699	605,072	68,444
Hard rubber combs.. *number*	107,280	6,300	368,092	21,680
Other manufactures of hard rubber	......	1,986	......	13,745
Friction or insulating tape..	35,364	1,877	140,876	7,155
Belts, hose, packing, and in**sulating material**	......	16,796	......	115,459
Druggists' sundries of soft rubber	......	7,500	......	48,966
Inflatable swimming belts, **floats, etc. ... *number***	74,745	3,720	595,233	33,265
Other manufactures	111,219	22,833	701,421	131,471
Totals	......	$137,296	......	$1,077,601

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	5,531,471	$904,666	16,961,351	$2,648,108
Balata	33,653	9,128	131,954	34,056
Gutta percha, rubber substitutes, and scrap	2,399	132	76,565	5,276
Rubber manufactures	......	1,069	......	9,365
Totals	......	$914,995	......	$2,696,805

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,344,610	$56,281	7,709,672	$353,273
Scrap	3,670,989	83,896	21,803,927	407,330
Cements ... *gal.*	17,752	16,492	108,076	86,235
Rubberized automobile cloth, *sq. yd.*	37,642	18,080	248,745	115,667
Other rubberized piece goods and hospital sheeting.. *sq. yd.*	101,616	43,785	634,036	248,340
Footwear				
Boots ... *pairs*	2,465	5,526	40,436	91,193
Shoes ... *pairs*	10,570	5,101	144,618	54,901
Canvas shoes with rubber soles ... *pairs*	21,983	13,716	102,650	61,926
Soles ... *doz. prs.*	3,240	5,785	13,097	22,895
Heels ... *doz. prs.*	20,929	12,988	203,090	130,199
Soling and top lift sheets..	31,728	4,668	204,500	40,650
Gloves and mittens.. *doz. prs.*	5,305	11,424	30,595	68,693
Water bottles and fountain syringes ... *number*	25,104	7,686	110,163	41,721
Other druggists' sundries...	......	40,190	......	245,759
Gum rubber clothing.... *doz.*	11,226	21,817	62,484	97,797
Balloons ... *gross*	25,137	26,493	150,652	134,842
Toys and balls	......	8,983	......	37,868
Bathing caps ... *doz.*	6,844	7,663	38,075	63,840
Bands	17,396	6,271	126,002	44,137
Erasers	33,243	18,316	184,304	108,113
Hard rubber goods				
Electrical hard rubber goods	......	16,443	......	101,313
Other hard rubber goods..	......	22,396	......	118,935
Tires				
Truck and bus casings, *number*	10,599	205,646	88,541	1,676,342
Other automobile casings, *number*	55,305	518,456	359,095	3,218,103
Tubes, auto ... *number*	51,937	75,587	323,365	504,622
Other casings and tubes, *number*	3,844	23,049	22,621	89,975
Solid tires for automobiles and motor trucks. *number*	565	15,265	2,646	72,241
Other solid tires	154,449	21,315	536,275	83,228
Tire sundries and repair materials	......	57,110	......	285,463
Rubber and friction tape....	46,623	14,597	329,195	87,116
Belts and belting	190,905	101,667	1,306,382	686,535
Hose	406,582	163,287	2,453,828	868,232
Packing	106,960	47,762	746,426	310,055
Mats, matting, flooring, and tiling	92,501	15,648	726,491	96,705
Thread	51,894	28,713	498,517	299,233
Gutta-percha manufactures..	146,739	37,856	462,924	120,020
Other rubber manufactures..	......	71,037	......	589,091
Totals	......	$1,850,995	......	$11,662,588

Rubber Goods Production Statistics

		1936	1935
TIRES AND TUBES*		June	June
Pneumatic casings			
Production	*thousands*	4,544	3,793
Shipments, total	*thousands*	4,692	4,134
Domestic	*thousands*	....	4,061
Stocks, end of month	*thousands*	6,345	10,433
Solid and cushion tires			
Production	*thousands*	....	16
Shipments, total	*thousands*	....	20
Domestic	*thousands*	....	19
Stocks, end of month	*thousands*	....	30
Inner tubes			
Production	*thousands*	4,078	3,376
Shipments, total	*thousands*	4,458	3,904
Domestic	*thousands*	....	3,840
Stocks, end of month	*thousands*	6,565	9,748
Raw material consumed			
Fabrics	*thous. of lbs.*	....	7,055
MISCELLANEOUS PRODUCTS			
Rubber bands, shipments	*thous. of lbs.*	209	227
Rubber-proofed fabrics, production, total	*thous. of yds.*	3,782	3,868
Auto fabrics	*thous. of yds.*	256	303
Raincoat fabrics	*thous. of yds.*	1,442	1,540
Rubber flooring, shipments	*thous. of sq. ft.*	488	400
Rubber and canvas footwear			
Production, total	*thous. of prs.*	5,659	4,151
Tennis	*thous. of prs.*	2,018	1,391
Waterproof	*thous. of prs.*	3,641	2,760
Shipments, total	*thous. of prs.*	4,334	3,002
Tennis	*thous. of prs.*	2,791	1,774
Waterproof	*thous. of prs.*	1,543	1,227
Shipments, domestic, total	*thous. of prs.*	4,290	2,964
Tennis	*thous. of prs.*	2,751	1,742
Waterproof	*thous. of prs.*	1,539	1,222
Stocks, total, end of month	*thous. of prs.*	18,822	19,358
Tennis	*thous. of prs.*	4,519	5,642
Waterproof	*thous. of prs.*	14,303	13,716

*Data for January to July, 1935, are estimated to represent approximately 97% of the industry; for August, September, October, November, and December, 1935, the coverage is estimated to be 81%.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

	July, 1936 *Crude Rubber		July, 1935 *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	4,747,530	$727,054	7,806,629	$857,231
New York	64,674,215	9,789,126	85,203,010	9,584,168
Philadelphia	3,324,287	512,227	2,068,660	244,294
Maryland	2,516,770	385,294	1,899,797	204,147
Georgia	1,466,665	224,625	......	......
Mobile	814,231	107,340	......	......
New Orleans	945,617	139,500	56,000	6,121
Los Angeles	10,135,971	1,354,599	10,171,684	1,003,861
San Francisco	498,683	73,133	574,096	66,577
Oregon	......	......	33,600	3,696
Ohio	227,732	30,774	......	......
Colorado	112,000	17,591	......	......
Totals	89,463,701	$13,361,263	107,813,476	$11,970,095

*Crude rubber including latex dry rubber content.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2189	Manufacturer of rubber thread.
2190	Supplier of refined balata.
2191	Supplier of rubber sheeting about 1/32-inch thick.
2192	Manufacturer of machine for slitting or slicing sponge rubber.
2193	Manufacturer of rubber fenders for buses.
2194	Information wanted on printing advertisements on balloons.
2195	Manufacturer of rubber tubing 1/8-inch in diameter.
2196	Who can print with indelible ink on a sponge rubber face cloth.
2197	Manufacturer of rubber belt vulcanizers.
2198	Manufacturer of 3/32-inch thick sheet rubber covered with protuberances 1/32-inch high.

U. S. Exports of Machinery Belting

	Rubber Belting		Leather Belting		Cotton Belting	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
1930	4,297,789	2,195,424	885,573	1,416,466	276,036	173,215
1931	3,191,417	1,382,149	581,264	823,707	179,038	96,856
1932	1,485,551	623,270	408,014	512,123	134,000	59,978
1933	1,792,608	783,482	514,281	630,116	145,582	67,901
1934	2,438,295	1,143,278	599,791	729,006	169,809	89,486
1935	2,640,030	1,272,162	689,968	835,124	269,644	136,923